City of Madison ALABAMA

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2040 TRANSPORTATION MASTER PLAN

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1.0 INTRODUCTION

1.1 PLAN PURPOSE AND BACKGROUND

The City of Madison 2040 Transportation Master Plan (2040-TP) serves as a blueprint for the City's development of its transportation network in a programmed, cost-effective manner that furthers its overall vision. The 2040-TP effort endeavored to develop a transportation network plan that reinforces the City's Core Values:

- Grow Strategically and Smart
- Reinforce Strong Neighborhoods
- Provide Better Connections
- Ensure Functionality with Inspiring Design

To further these goals, the "Complete Streets" concept is one of the Plan's focuses. Simply stated, Complete Streets principles recognize the need for a transportation network that serves automobile traffic in a manner that also accommodates and promotes (by design) the safe and comfortable travel by other modes such as transit, bicycling, and walking.

Four major tasks were undertaken to develop the 2040-TP:

- Establish Goals and Objectives – The goals and objectives established at the outset guided the identification of recommended improvements as well as the overall plan development process. More detail on the 2040-TP goals and objectives is provided later in this section.
- Assess Conditions and Identify Needs – Existing and projected network conditions were assessed to identify deficiencies impacting mobility and connectivity throughout the city.
- Develop and Evaluate Improvement Alternatives – Potential improvements to address identified mobility needs were developed and evaluated. This process was guided by the established goals and objectives, together with input from City staff, stakeholders and the public.
- Prioritize Recommendations and Estimate Costs – Improvements were recommended for near term or longer term implementation and planning level cost estimates were prepared.

1.2 PLAN OVERVIEW

The 2040-TP document presents the key plan development activities and findings in six sections:

1. Introduction – Presents the framework for 2040-TP development and the goals and objectives that will continue to guide the City as its moves forward to implement plan recommendations.
2. Growth and Land Use Trends – Summarizes the demographic and development trends that impact and will continue to influence Madison's growth into the future.
3. Current Transportation System – Identifies the network of roadways and bicycle/pedestrian facilities that is currently in place throughout the city.
4. Analysis of Existing and Projected Conditions – Describes the technical analysis methodologies and results utilized to determine and assess existing and projected conditions and needs.
5. Corridor Assessment and Potential Improvements – Outlines the potential improvements considered for the primary transportation corridors throughout the city.
6. Recommendations and Costs – Lists the near and longer term improvements recommended for implementation through year 2040 and provides cost estimates for planning purposes.

1.3 STUDY AREA

Approximately 30 square miles in size and located predominantly north of Interstate 565 in the western portion of the Huntsville Area Metropolitan Planning Organization (MPO) planning area, the City of Madison forms a square surrounded on all sides by the City of Huntsville. The 2040-TP study area, shown in Figure 1-1, consisted primarily of the area within the Madison City limits. However, due to the irregular shape of the jurisdictional boundaries, some characteristics of areas bordering Madison's City limits were taken into consideration. (Refer to the travel demand modeling discussion in section 4 for additional information.) Figure 1-2 shows the City of Madison in relation to the Huntsville region.

Given this locational context, it is understood that commuter through-traffic accounts for a portion of the traffic volumes experienced on Madison's roadways. Although it does not change the results, understanding through-traffic patterns helps in identifying routes that could mitigate congestion impacts during peak periods.

1.4 GOALS AND OBJECTIVES

Development of the goals and objectives for the 2040-TP considered several factors:

- Linkages to previous City initiatives
- Consistency with Federal, State and regional policy
- Specific focus on Complete Streets principles
- Applicability to potential performance measures

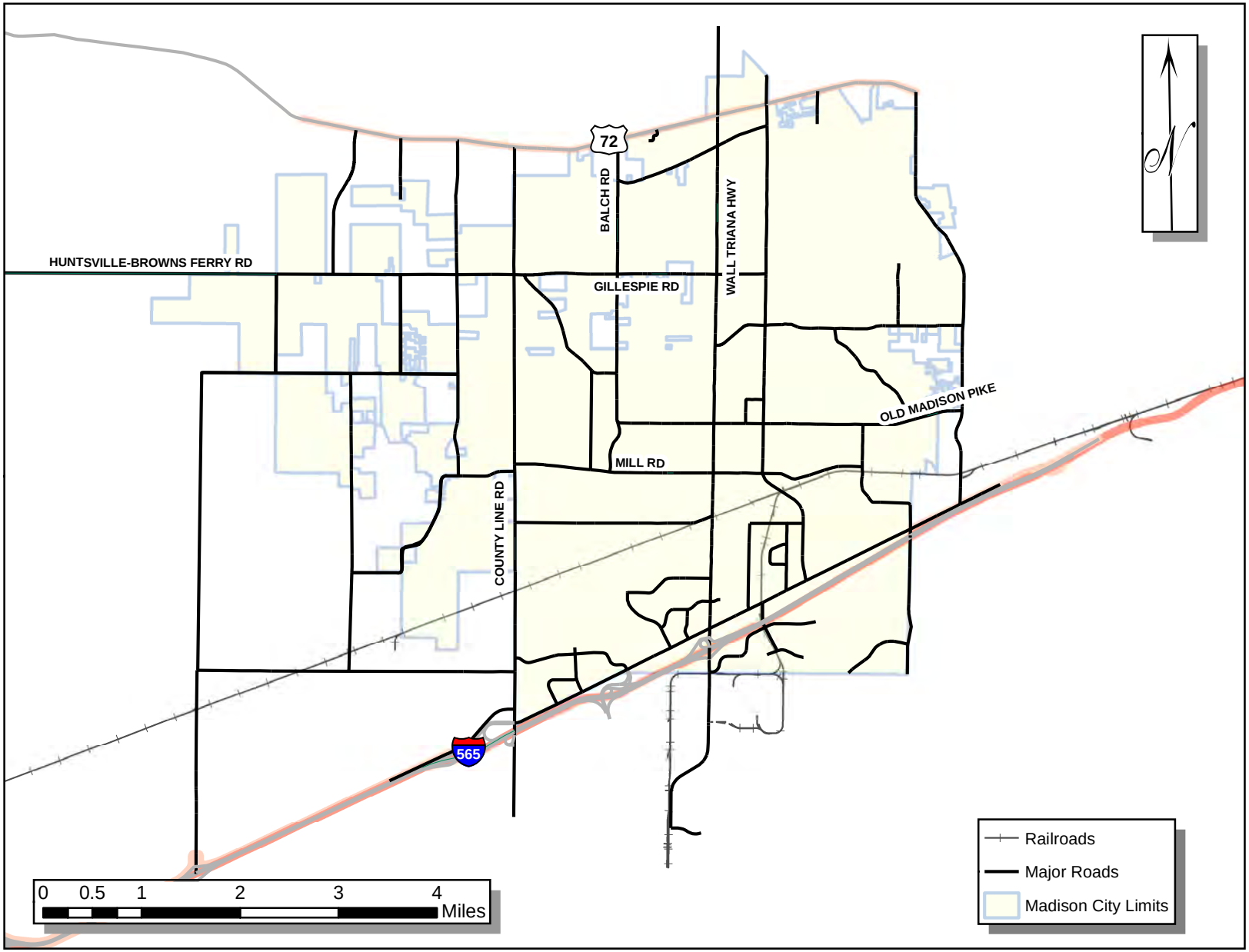
A review of relevant policy documents was conducted in crafting an overall framework for the City of Madison's transportation goals. A more detailed review of previous studies was provided in the interim *Baseline Conditions and Needs Assessment Report*. Emphasis areas identified to guide development of the goals and objectives for 2040-TP included:

- Mobility
- Safety
- Multimodal travel
- Land use interaction/context
- Connectivity
- Intergovernmental coordination

These emphasis areas were confirmed by input from the Steering Committee during a meeting on May 18, 2017. Table 1-1 lists the goals and objectives established for the 2040-TP.

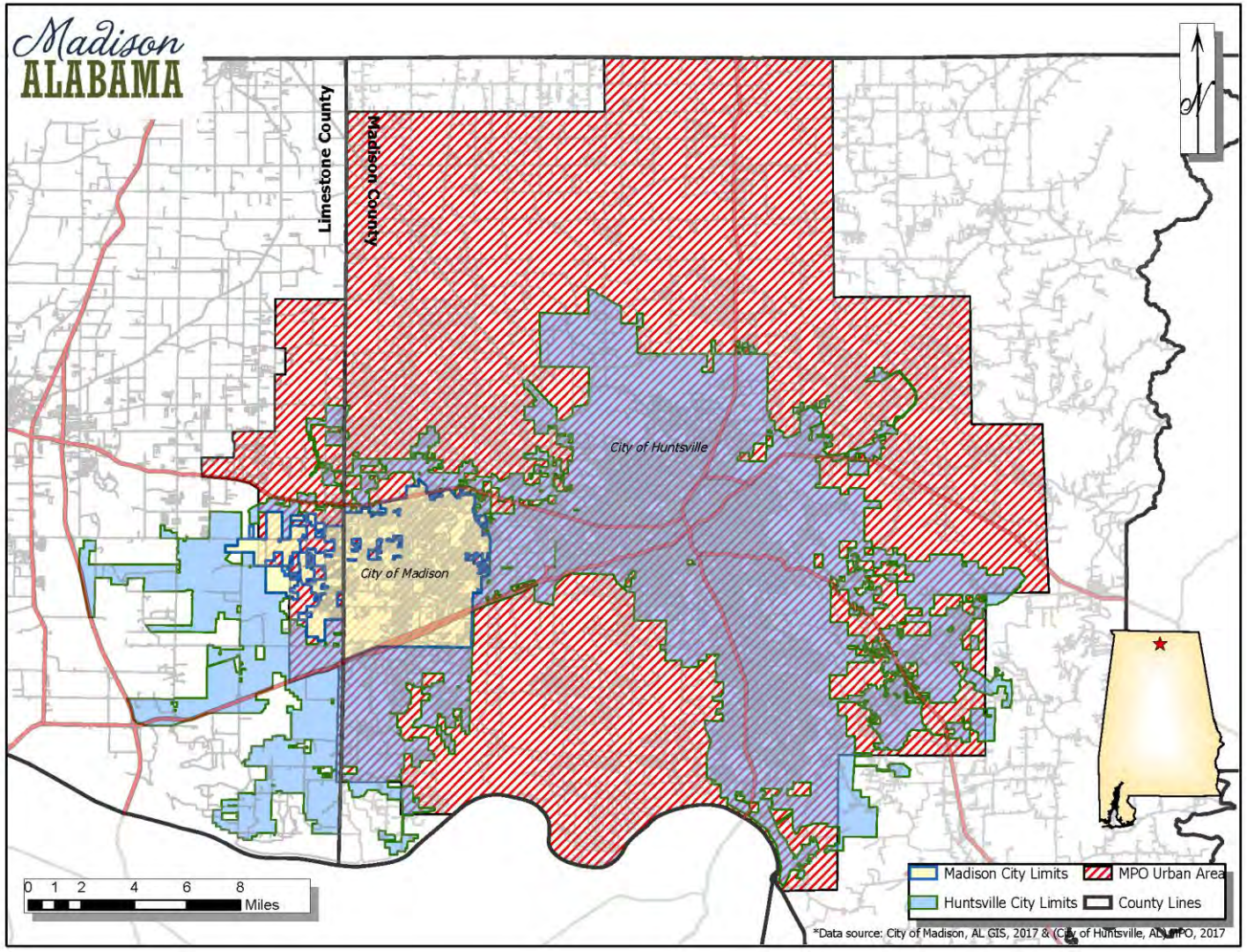
The City's progress towards meeting the established goals and objectives can be periodically assessed with performance metrics that are tied to particular goals. These metrics, shown in Table 1-1 with the corresponding goals and objectives, take into consideration the availability of necessary data and the level of effort required for the monitoring process.

Figure 1-1: Study Area



*Data Source: City of Madison, AL, GIS, 2017

Figure 1-2: Huntsville MPO Region



Source: City of Huntsville (Huntsville MPO)

Table 1-1: Goals, Objectives and Performance Metrics

Goals	Objectives	Related Performance Metrics
Improve mobility throughout the City of Madison	Reduce congestion and increase travel reliability along the city's arterial and major collector roadways	- Volume-to-capacity (V/C) ratios along the city's arterials and major collectors - Travel time along the city's arterials and major collectors
Increase safety throughout the city's transportation network	Promote safety along the city's transportation network	- Rate of auto crashes per vehicle miles traveled - Number of bicycle and pedestrian crashes
Promote travel by alternative modes	Promote the application of Complete Streets concepts during the improvement of existing roadways or construction of new roadways	- Miles of bike lanes and bike trails - Linear feet of sidewalks - Number of pedestrian crosswalks
Promote land use context through active transportation	Enhance pedestrian connections at activity centers	- Sidewalk and trail connections to commercial and recreational activity centers - Pedestrian signals at commercial and recreational nodes
Increase connectivity of the transportation network for all users (i.e., ADA* compliance)	Increase the interconnectivity between roadways and on-street and off-street bicycle and pedestrian facilities	- Level of connectivity of bicycle and pedestrian network (qualitative) - Linear feet of ADA-compliant sidewalks - Number of ADA-compliant intersections - Number of ADA-compliant driveways
Maximize potential implementation opportunities through interagency coordination	Maintain active coordination with ALDOT, the Huntsville Area MPO, Madison County, Limestone County and the City of Huntsville on the status of planned and programmed projects	- Attendance by City representatives at MPO policy board meetings - Attendance at TCC meetings by City staff

** Americans with Disabilities Act (ADA)*

2.0 GROWTH AND LAND USE TRENDS

Population, employment and development trends provide a basis for understanding travel patterns. This section provides an overview of growth and land use trends that impact transportation in Madison.

2.1 POPULATION AND HOUSEHOLDS

According to the latest data from the U.S. Census Bureau's American FactFinder,[1] the City of Madison has a current population of approximately 48,000. The City of Madison has experienced significant growth since 1980, as shown in Table 2-1. Much of that growth is attributable to the growth of the overall Huntsville metropolitan area. Given Madison's location relative to Huntsville's employment centers, it is not surprising that most of Madison's growth has occurred in its eastern portions.

Table 2-1: Historical Population Growth for the City of Madison

Year	Population	Change	% Change
1980	4,057	**	**
1990	14,904	10,847	267.4%
2000	29,329	14,425	96.8%
2010	42,938	13,609	46.4%
2017	47,959	5,021	11.7%

Source: US Census Bureau, 2017[2]

The distribution of population throughout the city is a key variable in determining transportation needs and travel patterns. City staff completed a comprehensive parcel-by-parcel inventory of all existing parcels in all zoning/land use types for properties within Madison and the portions of Huntsville within the study area boundaries. After the 2017 household count was estimated, household projections were completed by City staff for the years 2025 and 2040 based on:

- Issued permits without development having occurred
- Approved projects
- Planned development applications in progress
- Opportunity or likelihood of development of vacant acreage

Table 2-2 presents household growth trends in and around the City of Madison. Residential growth through 2040 is projected to be substantial and occur at a steady rate.

Table 2-2: Existing and Projected Households in the Madison Study Area

2017 Estimated Households (Baseline)	25,170
2025 Projected Households	31,310
2040 Projected Households	40,340
2017-2025 Projected Household Increase	6,040 (24%)
2025-2040 Projected Household Increase	9,030 (29%)
2017-2040 Projected Household Increase	15,070 (60%)

Source: City of Madison Planning Department
Note: Includes areas outside of Madison's municipal boundaries

[1] https://www.census.gov/quickfacts/fact/table/madisoncityalabama/PST045216
[2] Ibid.

The areas projected to experience the most residential growth between 2017 and 2025 are:

- West of County Line Road in Limestone County
- Along Zierdt Road south of I-565

It should be noted that, due to existing build-out, many of the areas east of County Line Road are projected to experience little development increase. Growth in these areas is limited to infill development and redevelopment activities. Although some of the high growth areas listed above are outside the Madison City limits, development growth will nevertheless impact roadways in Madison.

The distribution of households in 2017 is fairly consistent citywide, as shown in Figure 2-1. The area's relatively low population density is due to the large number of single-family households. The projected distribution of households in 2025 and 2040 is shown in Figures 2-2 and 2-3, respectively.

2.2 EMPLOYMENT

Unlike population, historical counts for the number of jobs specifically within the City of Madison are not available. Estimates developed by City of Madison staff indicate approximately 34,640 jobs within the Madison study area. Table 2-3 presents the estimated and projected employment in and around the City of Madison.

Table 2-3: Existing and Projected Employment[1]

2017 Estimated Employment	34,640
2025 Projected Employment	45,860
2040 Projected Employment	67,130
2017-2025 Projected Employment Increase	11,220 (40%)
2025-2040 Projected Employment Increase	21,270 (46%)
2017-2040 Projected Employment Increase	32,490 (94%)

Source: City of Madison Planning Department
Note: Includes areas outside of Madison's municipal boundaries

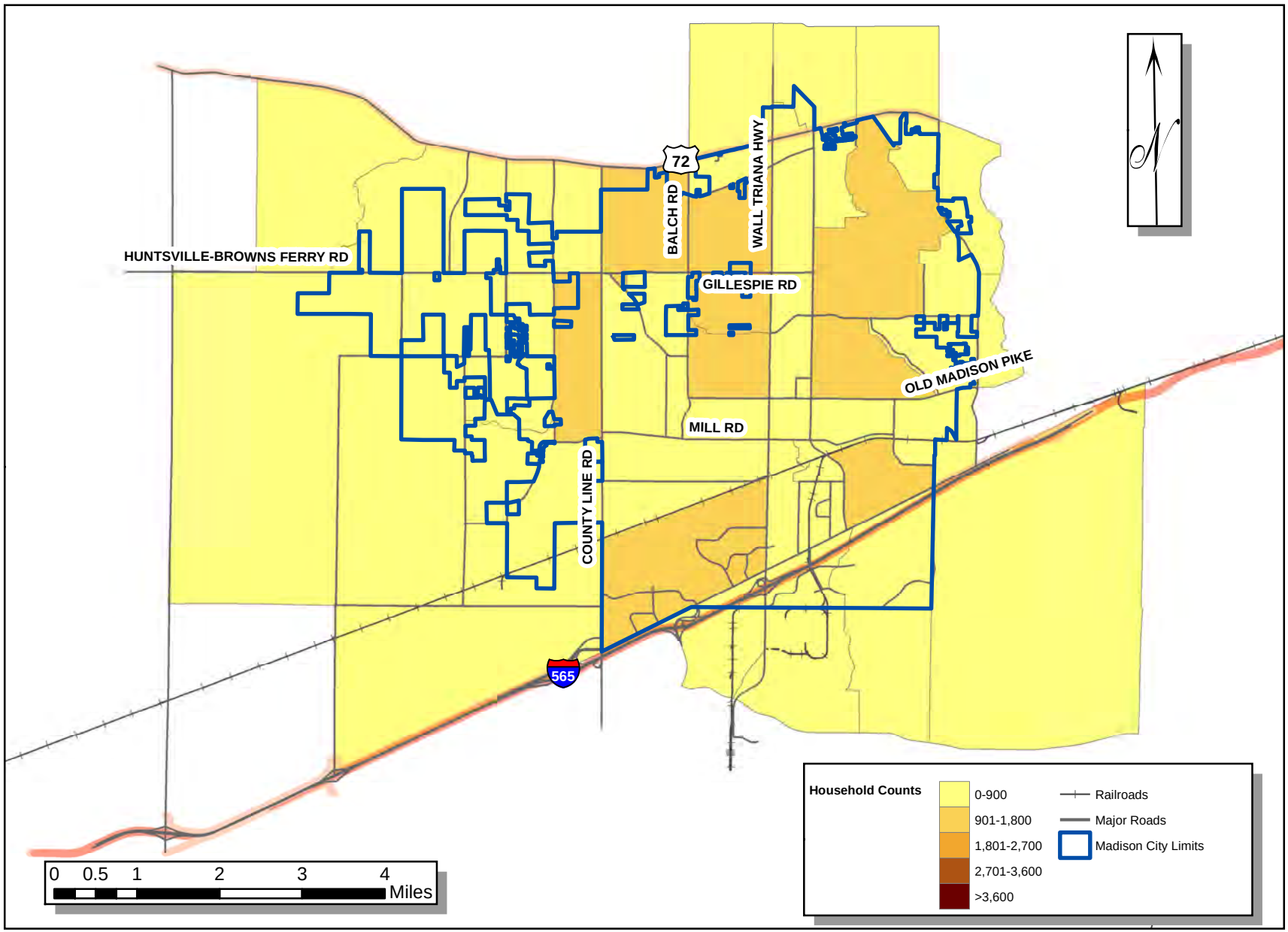
The areas projected to experience the most growth in jobs between 2017 and 2025 include:

- South of I-565 between Wall Triana Highway and Zierdt Road (Town Madison)
- East of the city on Redstone Arsenal, at the Redstone Arsenal Gateway south of I-565

From 2025 to 2040, the areas projected to experience significant increases in employment are those listed above, as well as areas between Highway 72 and Huntsville-Browns Ferry Road west of County Line Road. It should be noted that much of the employment increase is due to activity occurring outside of the Madison City limits. Several of the active business development areas, particularly near Huntsville International Airport and Redstone Gateway, are actually located within the City of Huntsville.

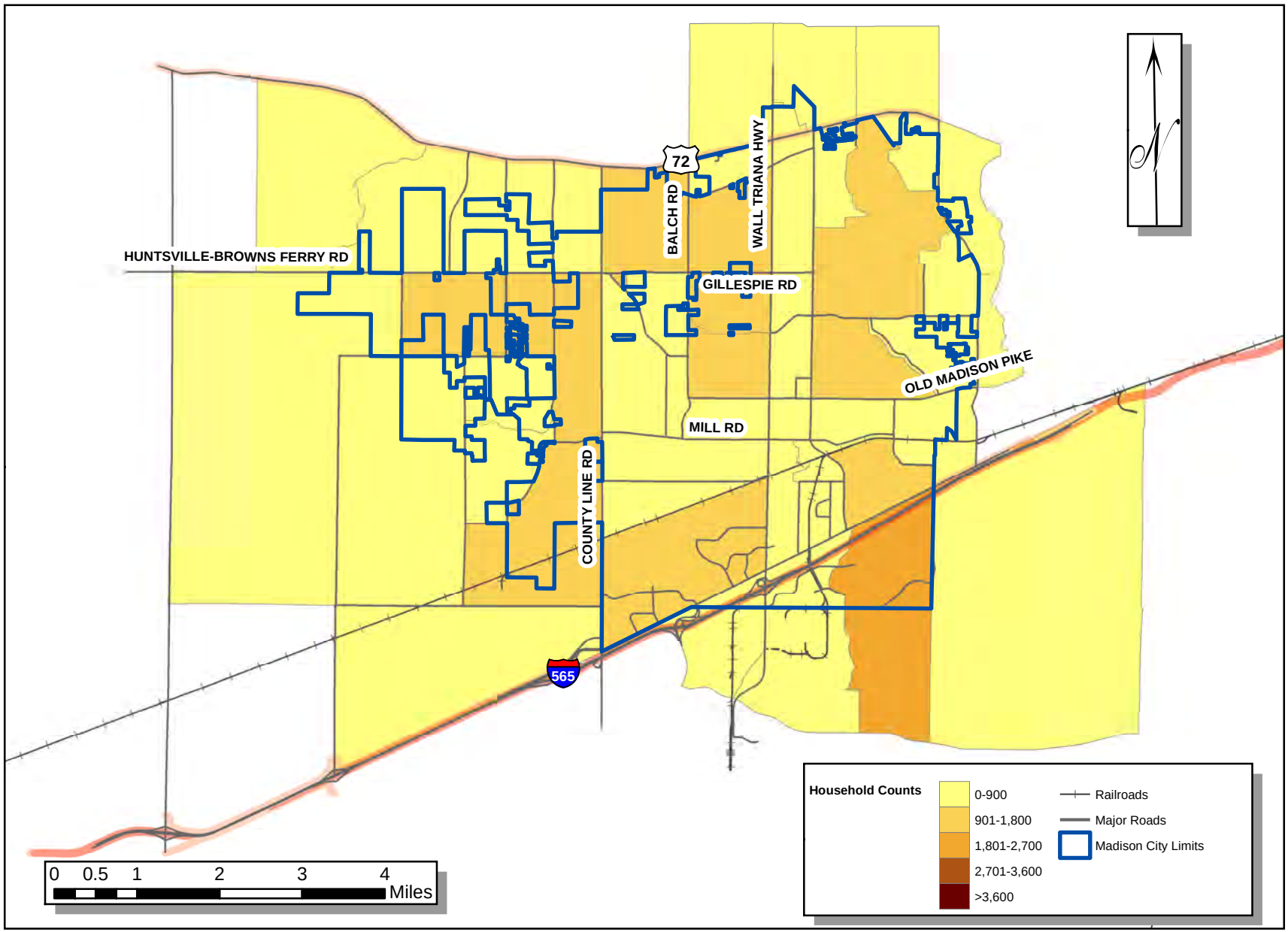
As Figure 2-4 shows, most of the existing 2017 baseline employment is located along Madison Boulevard between Wall Triana Highway and County Line Road, along Wall Triana Highway south of I-565, and, to a lesser degree, along Highway 72. The projected distribution of employment for years 2025 and 2040 is shown in Figures 2-5 and 2-6, respectively.

Figure 2-1: 2017 Household Distribution by TAZ



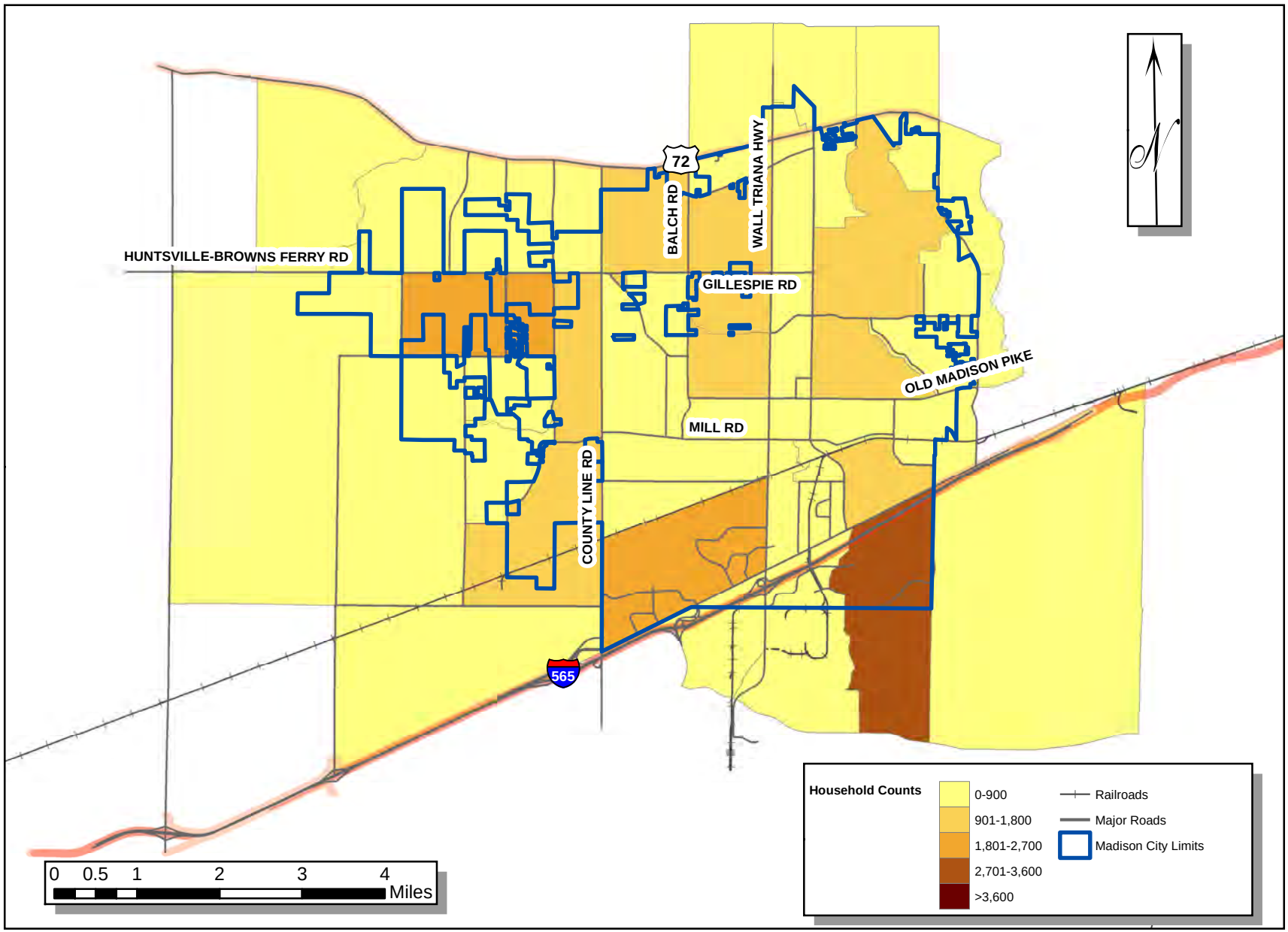
*Data Source: City of Madison, AL, GIS, 2017

Figure 2-2: 2025 Household Distribution by TAZ



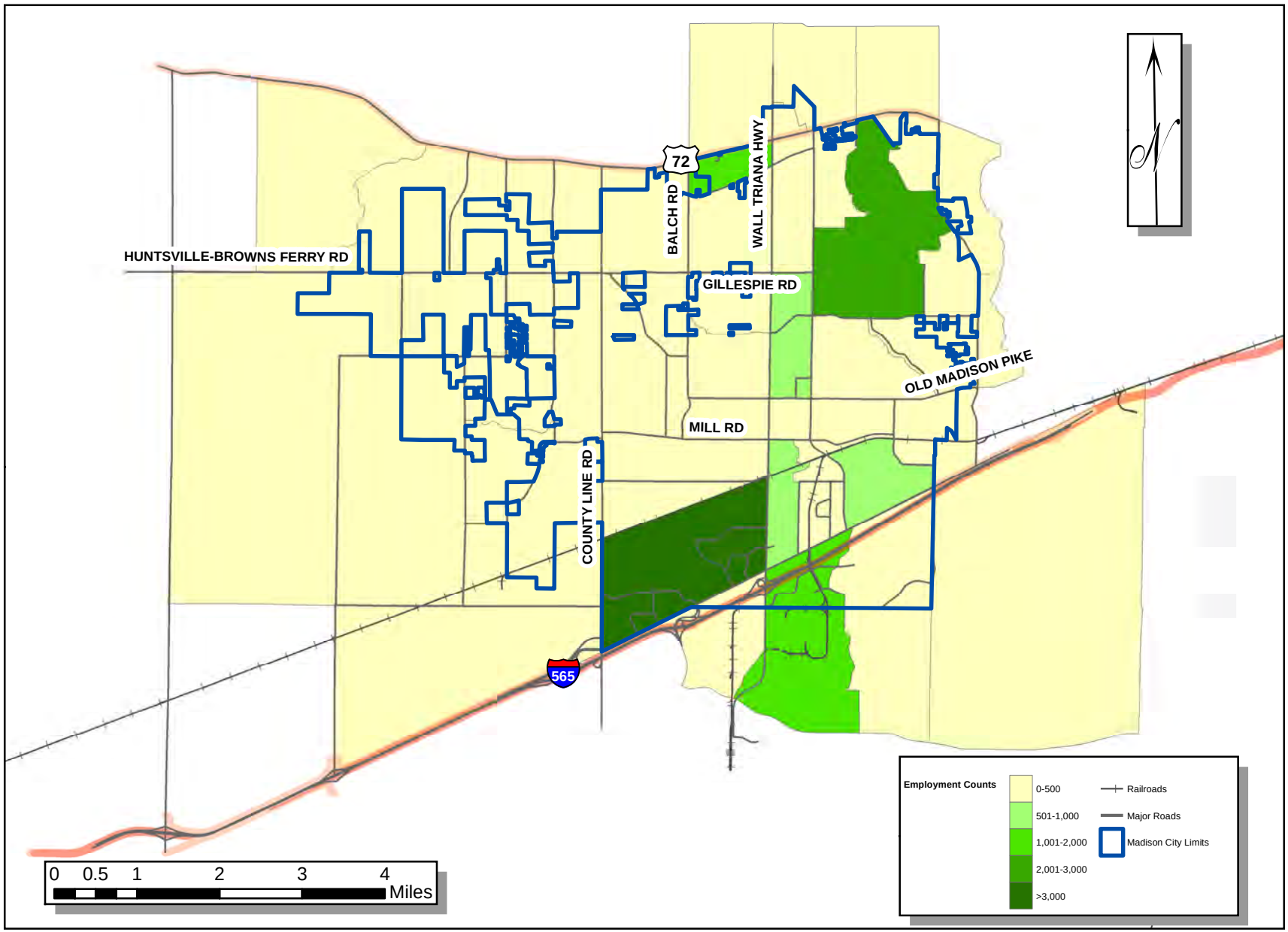
*Data Source: City of Madison, AL, GIS, 2017

Figure 2-3: 2040 Household Distribution by TAZ



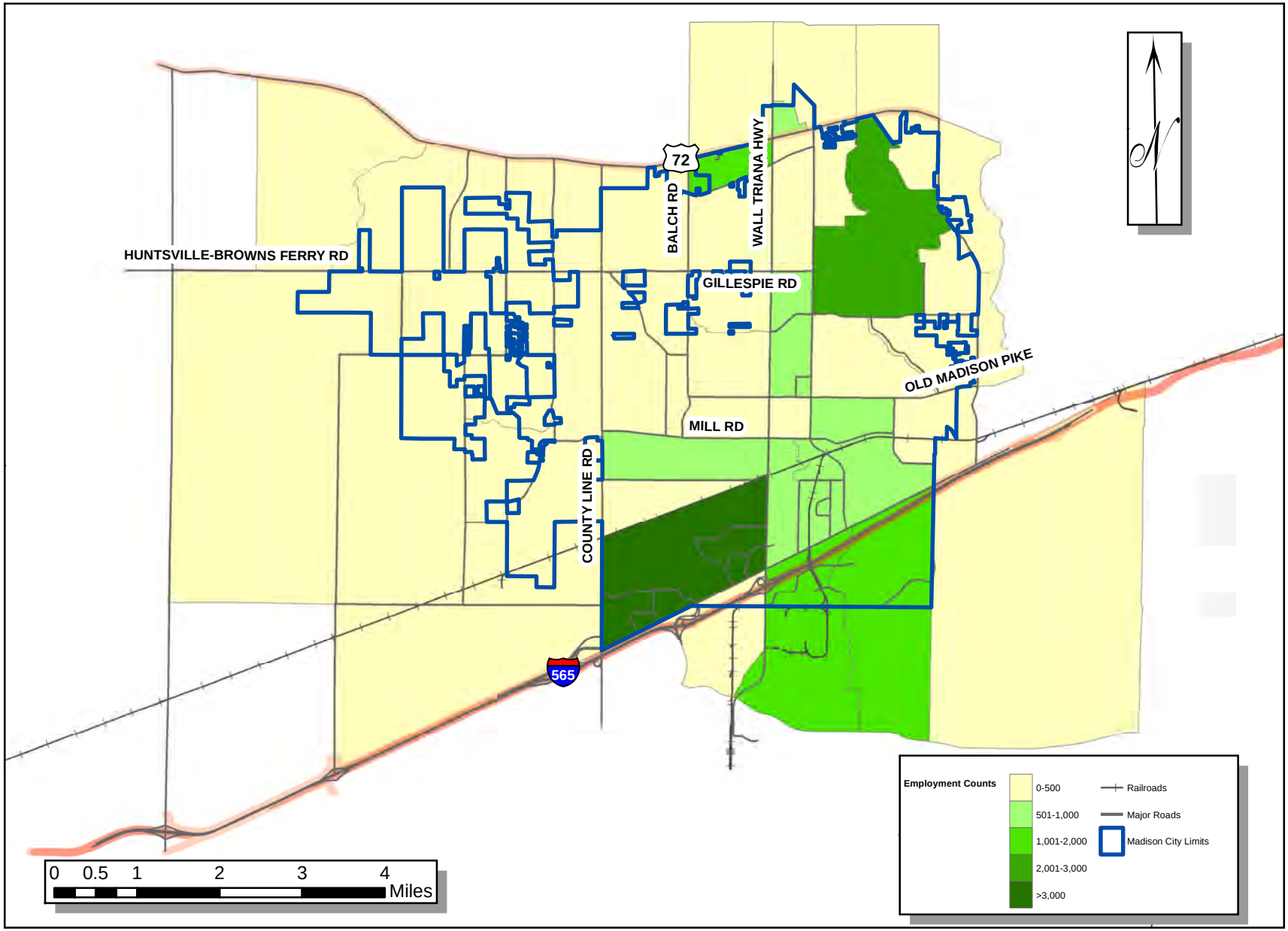
*Data Source: City of Madison, AL, GIS, 2017

Figure 2-4: 2017 Employment Distribution by TAZ



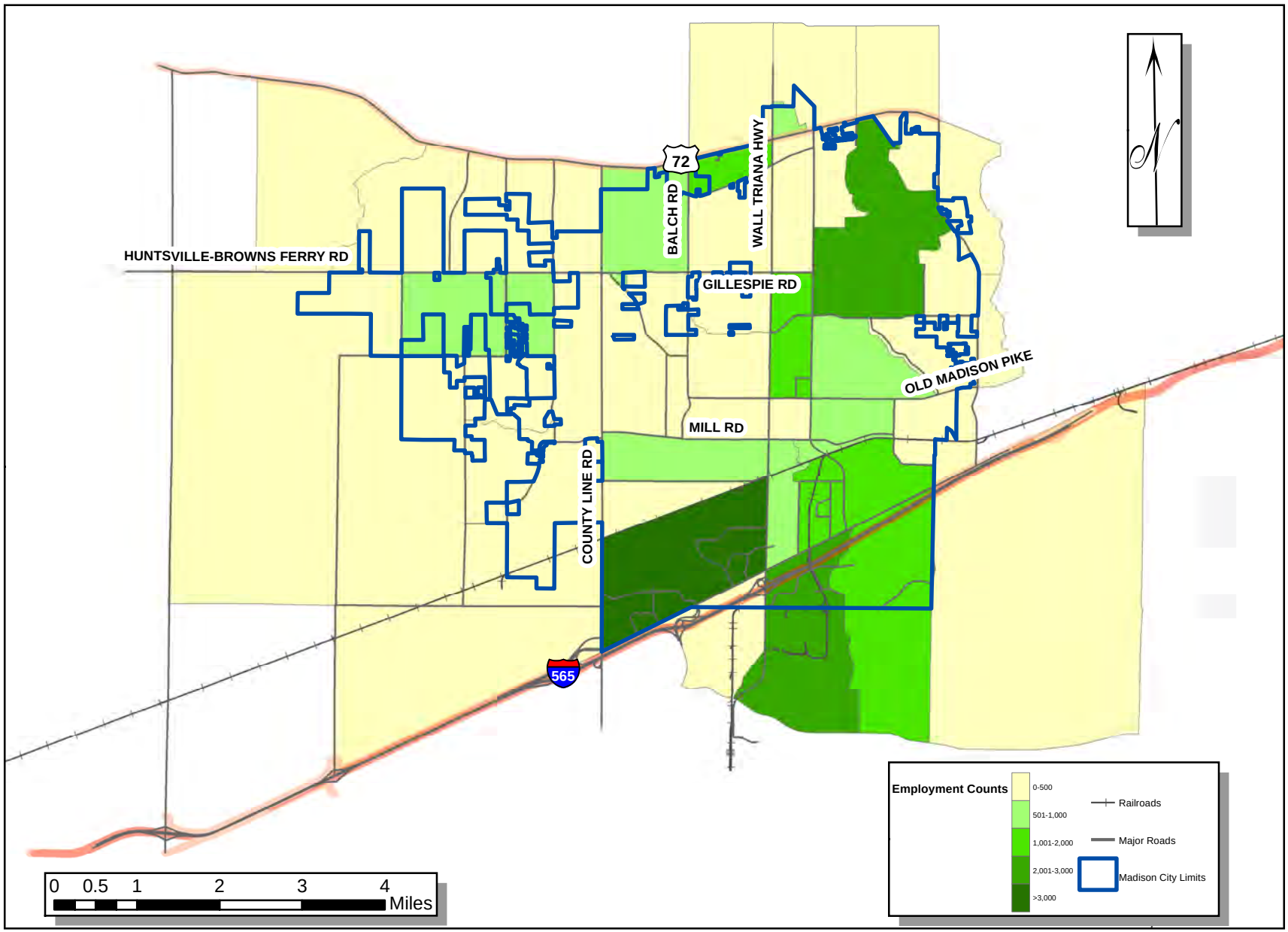
*Data Source: City of Madison, AL, GIS, 2017

Figure 2-5: 2025 Employment Distribution by TAZ



*Data Source: City of Madison, AL, GIS, 2017

Figure 2-6: 2040 Employment Distribution by TAZ



*Data Source: City of Madison, AL, GIS, 2017

2.3 LAND USE AND DEVELOPMENT

Understanding land use and development trends and policies is critical when considering transportation solutions because land use and transportation are inherently linked. Assessing current and projected land use and development can assist in identifying specific needs along certain transportation corridors. Residential development is of particular importance in a transportation study because of the large number of peak hour commute trips and school trips it tends to generate.

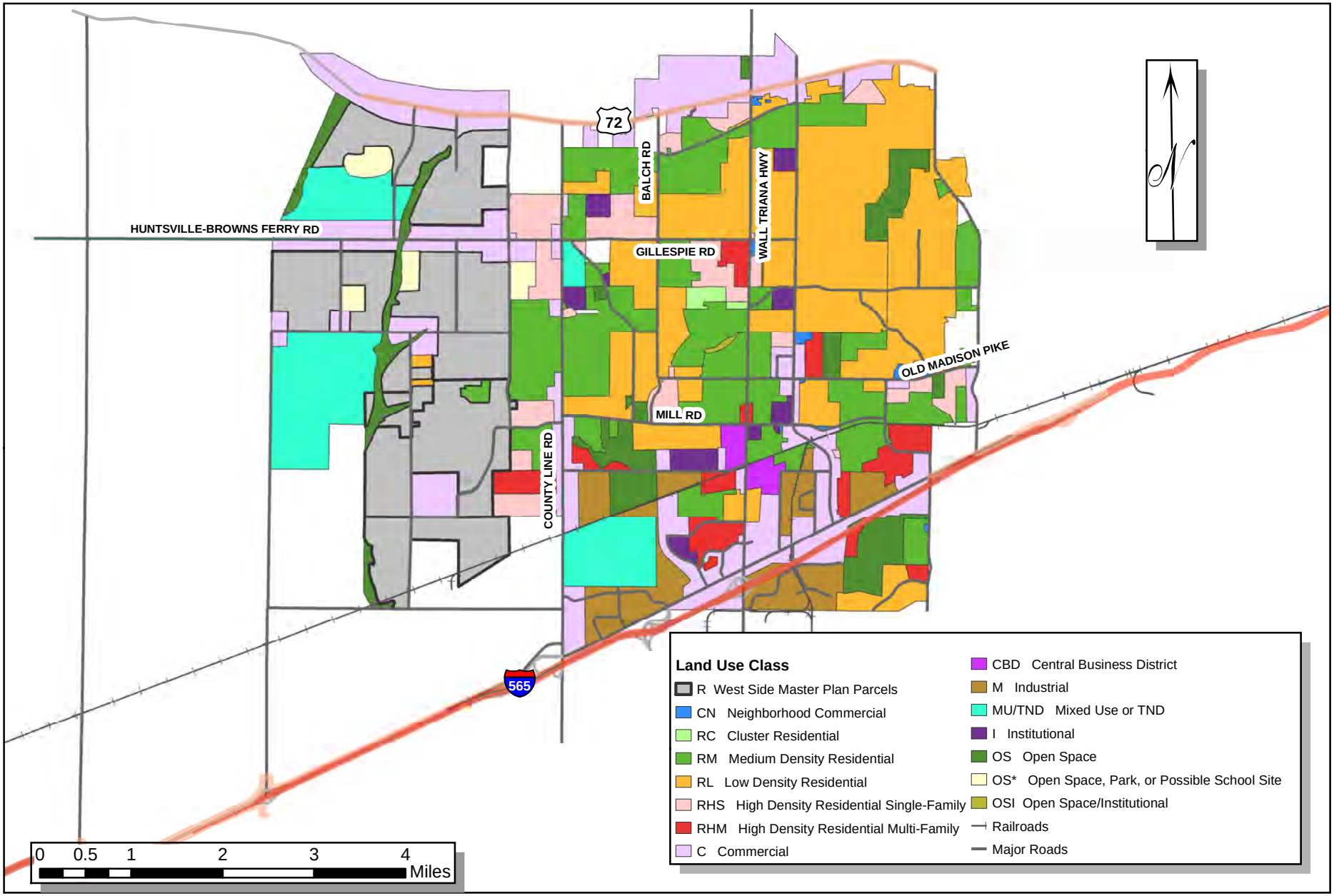
The basis of this analysis is the City's future land use map, shown in Figure 2-7. As can be seen, residential development is located throughout the study area. Nearly all residential development consists of single-family homes in varying densities, with limited multi-family development.

Madison's primary commercial corridors are Highway 72 and Madison Boulevard, while Hughes Road and County Line Road also have nodal commercial uses at intersections. The commercial uses primarily consist of strip shopping centers, restaurants and convenience retail, which generate large numbers of trips for short-term purposes. Because of the amount of ingress and egress associated with commercial uses, access management techniques to promote safe and efficient travel are a priority at these locations. In addition, there are several undeveloped commercial corridors in the western part of the city, especially along Huntsville-Browns Ferry Road, where access management should be integrated during initial development activities to mitigate future operational issues.

The locations of industrial land uses are important because they tend to have a much higher share of transport truck traffic. Operational issues due to the larger vehicles' wider turning radii and slower deceleration/acceleration requirements are common concerns at such locations. In Madison, these uses are mostly located in the southern portion of the city between the Norfolk Southern Railroad and the Madison Boulevard/I-565 corridor.

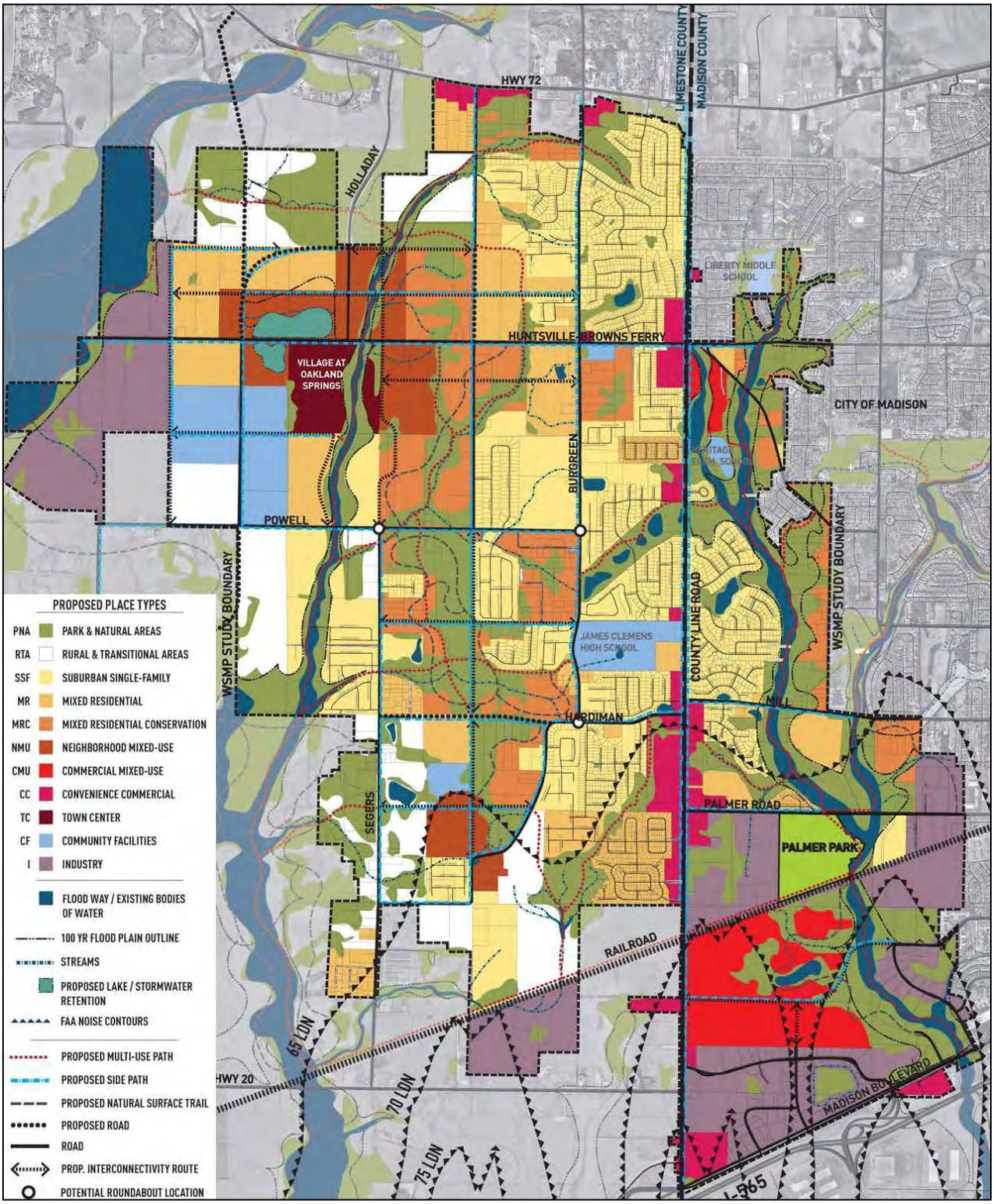
The West Side Master Plan is a key land use planning effort for the City. Although the area's current zoning is primarily agriculture and much of it is still unincorporated, the Plan calls for a detailed mix of land uses and defines density ranges for the western portion of Madison, as shown in Figure 2-8. Developed to conform to noise contour lines associated with the Huntsville International Airport, the Plan provides for a great deal of mixed commercial and industrial uses south of Palmer Road, with most residential development north of the contour lines. Given the area's development potential, traffic counts should be measured and tracked and impacts monitored as development occurs. While not currently reflected in either future land use map, increasing multi-use development along Highway 72 in order to minimize congestion impacts is one strategy identified through discussions with City officials. More detail on the West Side Master Plan was provided in the interim *Baseline Conditions and Needs Assessment Report*.

Figure 2-7: City of Madison Future Land Use Map



*Data Source: City of Madison, AL, GIS, 2017

Figure 2-8: West Side Master Plan Vision Map



Source: City of Madison, West Side Master Plan, 2015

3.0 CURRENT TRANSPORTATION SYSTEM

The City of Madison's current transportation system encompasses a network of roadway, bicycle and pedestrian facilities that facilitate mobility and connectivity citywide. The characteristics of the existing system are presented in this section.

3.1 ROADWAY NETWORK

The City of Madison's roadway network is characterized by two major east-west travel corridors through the extreme northern and southern sections of the city – Highway 72 and I-565/Madison Boulevard. The two corridors are connected via a number of north-south minor arterials and collector streets. East-west travel within the interior of the city is served by several local collectors.

3.1.1 Roadway Lanes

The majority of surface roadways within the City of Madison have two lanes. Exceptions to this include I-565, which has six lanes, as well as Highway 72, County Line Road, Madison Boulevard, and the segment of Hughes Road from Madison Boulevard to Plaza Boulevard, which all have four lanes. In addition, continuous center turn lanes exist along some two-lane segments of Hughes Road, Old Madison Pike, and Sullivan Street to benefit their overall roadway operations. Figure 3-1 identifies the number of lanes for key roadways.

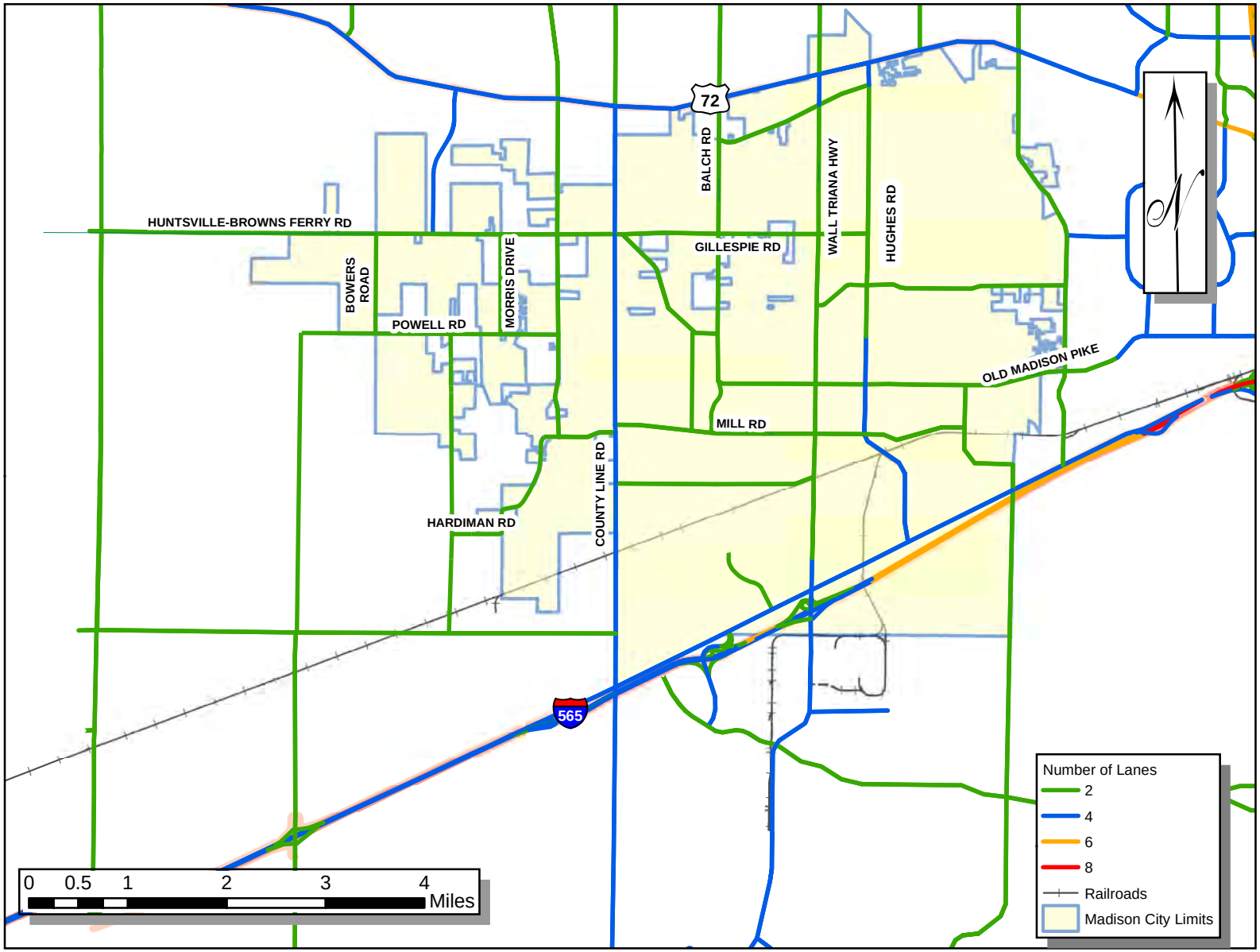
3.1.2 Functional Classification

Functional classification is the process by which roadway facilities are grouped into classes according to the character of traffic service they are intended to provide. Each category places a different emphasis on providing the two major functions of a roadway – movement of traffic and access to property.

- Interstates – Defined as significant highways that feature limited access and continuous, high-speed movements for a wide variety of traffic types. I-565 is the only interstate highway in the City of Madison (and in the Huntsville region).
- Arterials – Typically carry higher volumes at higher speeds and for longer trip lengths. Arterials are further classified as principal or minor depending on the amount of traffic they carry and their overall connectivity within a specific region. The only principal arterial within the city is Highway 72. Minor arterials include Madison Boulevard, Wall Triana Highway, Slaughter Road and County Line Road.
- Collectors – Allow access to activity centers from residential areas. Many of the primary roadways within the city are collectors, which are further categorized as major or minor. Major collectors include Hughes Road, Balch Road, Old Madison Pike and Burgreen Road. Minor collectors include Mill Road, Gillespie Road, Eastview Drive, and Highland Drive.
- Local Roads – Provide excellent access to adjacent properties, but move significantly less traffic through an area at slower speeds. The majority of roadway miles in the city are comprised of local roads. It should be noted that local roadways are not a priority of this plan given its focus on citywide mobility.

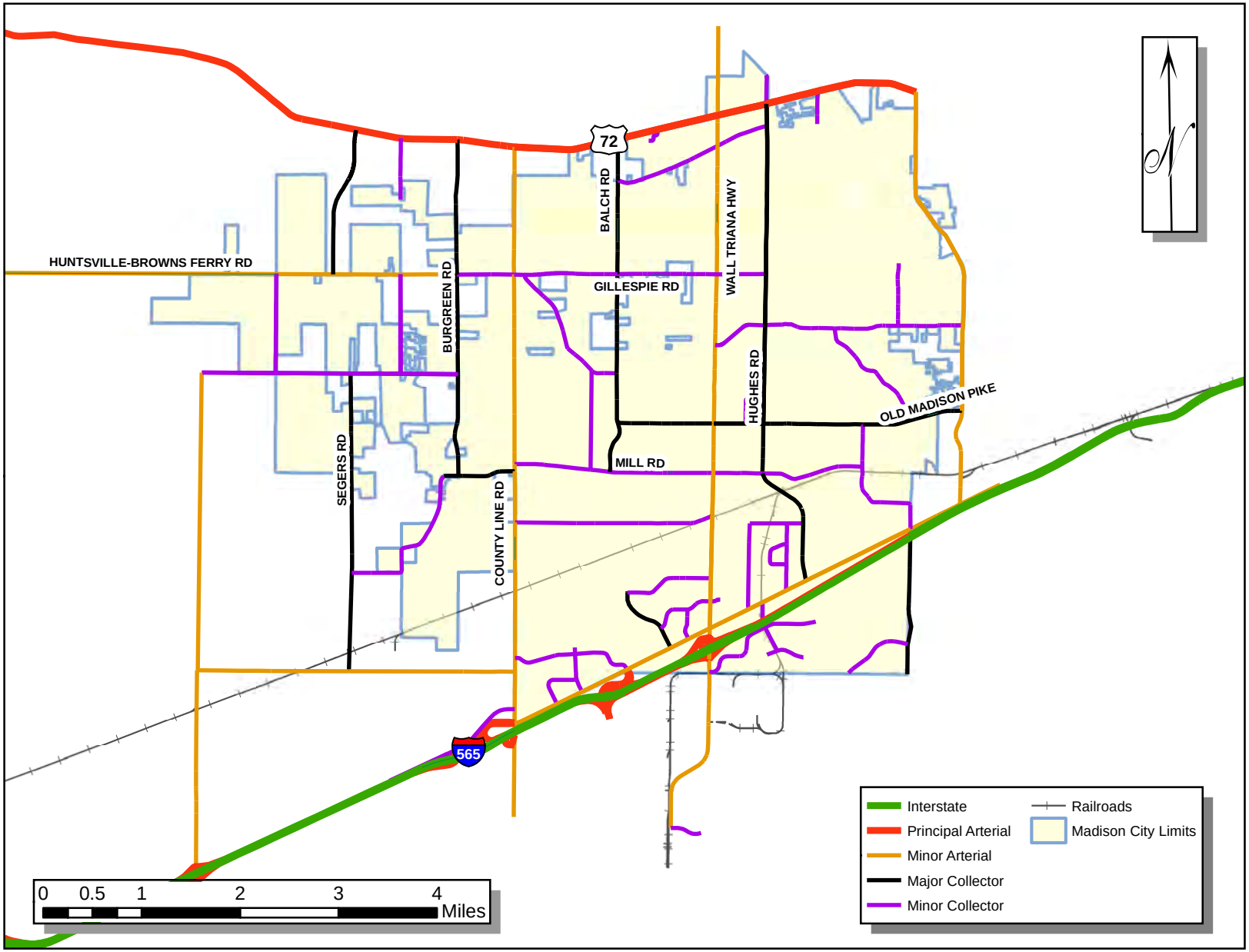
Typically, functional classification is determined by local representatives, who coordinate with the Alabama Department of Transportation (ALDOT) to obtain an official designation. Figure 3-2 shows the functional classification of roadways in and around the City of Madison.

Figure 3-1: Number of Roadway Lanes



*Data Source: (City of Huntsville, AL) MPO, 2017 & City of Madison, AL, GIS, 2017

Figure 3-2: Roadway Functional Classification



*Data Source: (City of Huntsville, AL) MPO, 2017 & City of Madison, AL, GIS, 2017

3.1.3 Signalization

Identifying the location of signalized intersections can assist in determining where operational improvements related to signal adjustments and/or enhancements could potentially be applied. The City of Madison maintains approximately 42 signals in and around Madison, as shown on Figure 3-3. In contrast, the City of Huntsville maintains the signals at the following intersections:

- Highway 72 at County Line Road
- Highway 72 at Wal-Mart entrance (Promenade Point Parkway)
- Highway 72 at Balch Road
- Highway 72 at Hughes Road
- Highway 72 at Nance Road
- Highway 72 at Jeff Road/Slaughter Road
- Slaughter Road at Farrow Road
- Slaughter Road at Old Madison Pike
- Slaughter Road at Madison Boulevard
- Wall Triana Highway at Dunlop Boulevard
- Zierdt Road at Nature Way

3.1.4 Other Roadway Characteristics

Train traffic and significant at-grade railroad crossings are important considerations when identifying potential recommendations and safety hazards. The southern portion of the City of Madison is traversed by the Norfolk Southern Railway. Critical at-grade crossings occur at the following roadways:

- Sullivan Street (Wall Triana Highway)
- Shelton Road
- Slaughter Road

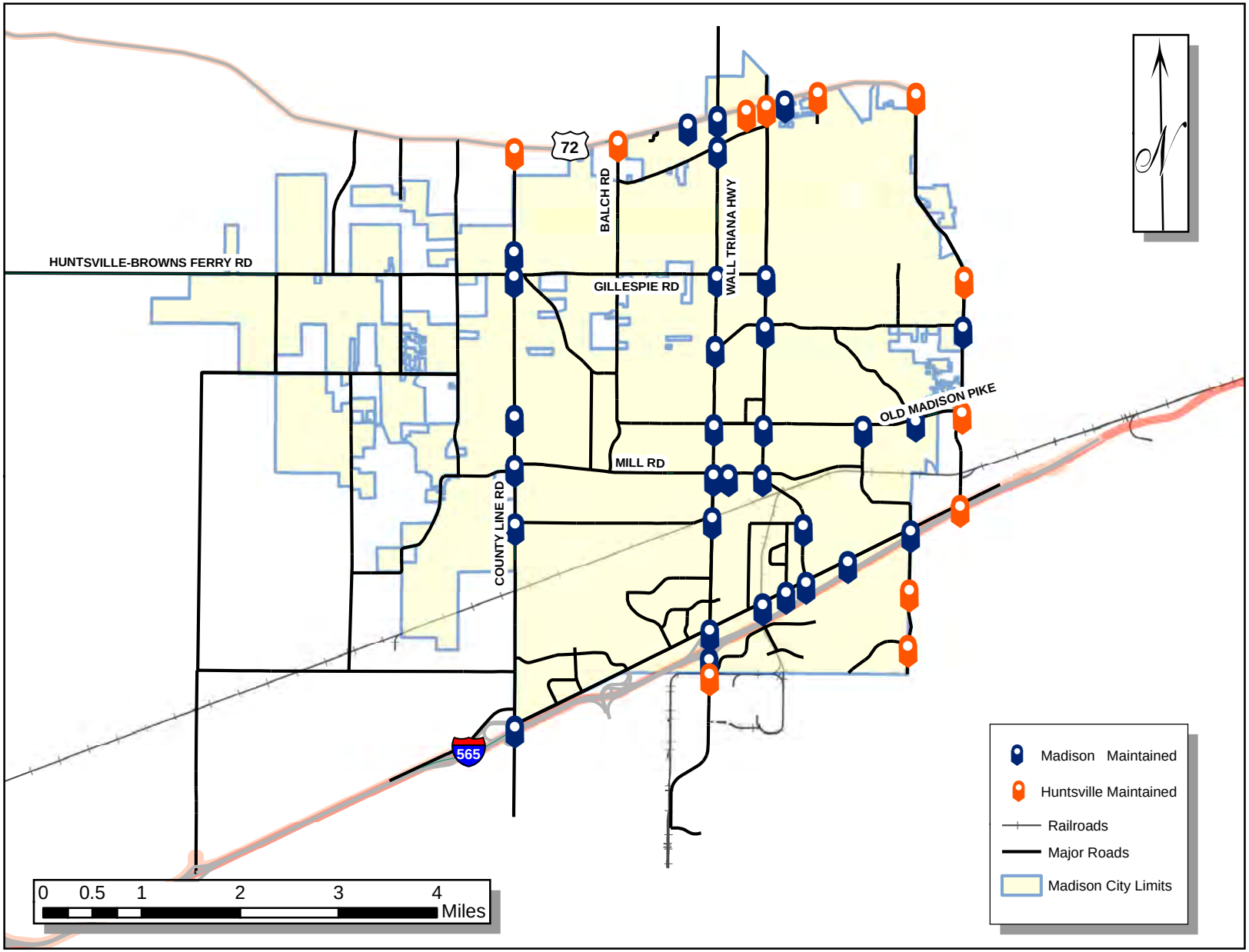
Roadway maintenance jurisdiction is an important factor when developing recommendations involving roadway widenings, operational improvements, and bicycle and pedestrian accommodations. Generally, the City has more flexibility in implementing recommendations along roadways under their own maintenance responsibility. The only surface street within the City but not under its maintenance responsibility is Highway 72, which is maintained by ALDOT.

3.2 PEDESTRIAN AND BICYCLE FACILITIES

The City of Madison is fortunate to already have an extensive system of sidewalks and trails, which forms the backbone of its ongoing expansion to the pedestrian and bicycle network. Figure 3-4 shows existing pedestrian and bicycle facilities in the City of Madison. A profile of bicycle and pedestrian connectivity, shown in Figure 3-5, was developed with information from the City of Madison GIS.

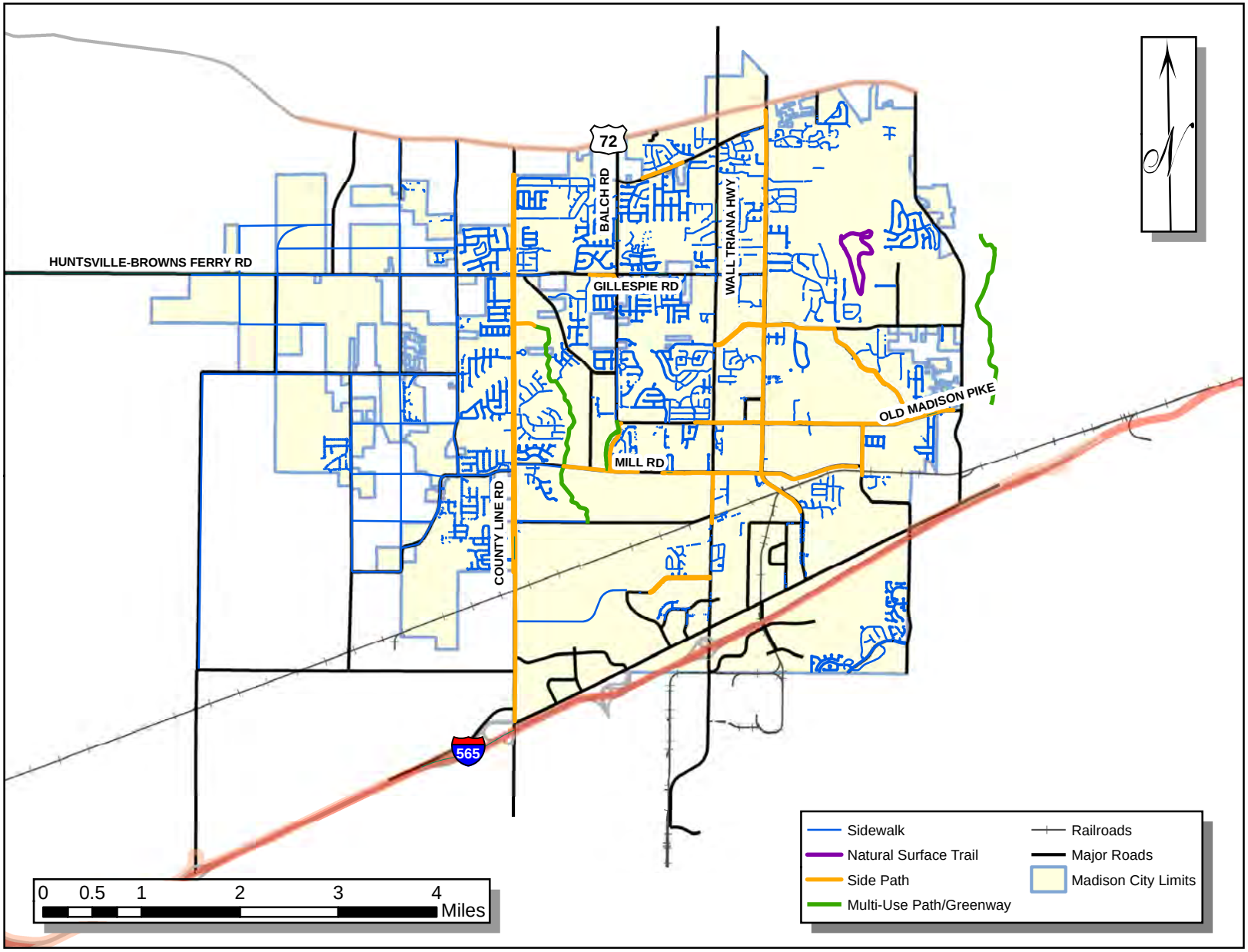
Because Madison's significant residential growth has occurred primarily within the past several decades, and sidewalks were required in new residential development during this period, a large portion of its neighborhood streets have sidewalk on at least one side. In the more recently developed western side, sidewalks are commonly found on both sides of the street. Like most localities in recent years, the City's Zoning Ordinance includes sidewalk requirements. Article V, Section 5-18A (Ord. 97-50) requires 5-foot concrete sidewalk along the adjacent public City street frontage for projects subject to the provisions.

Figure 3-3: Signalized Intersections



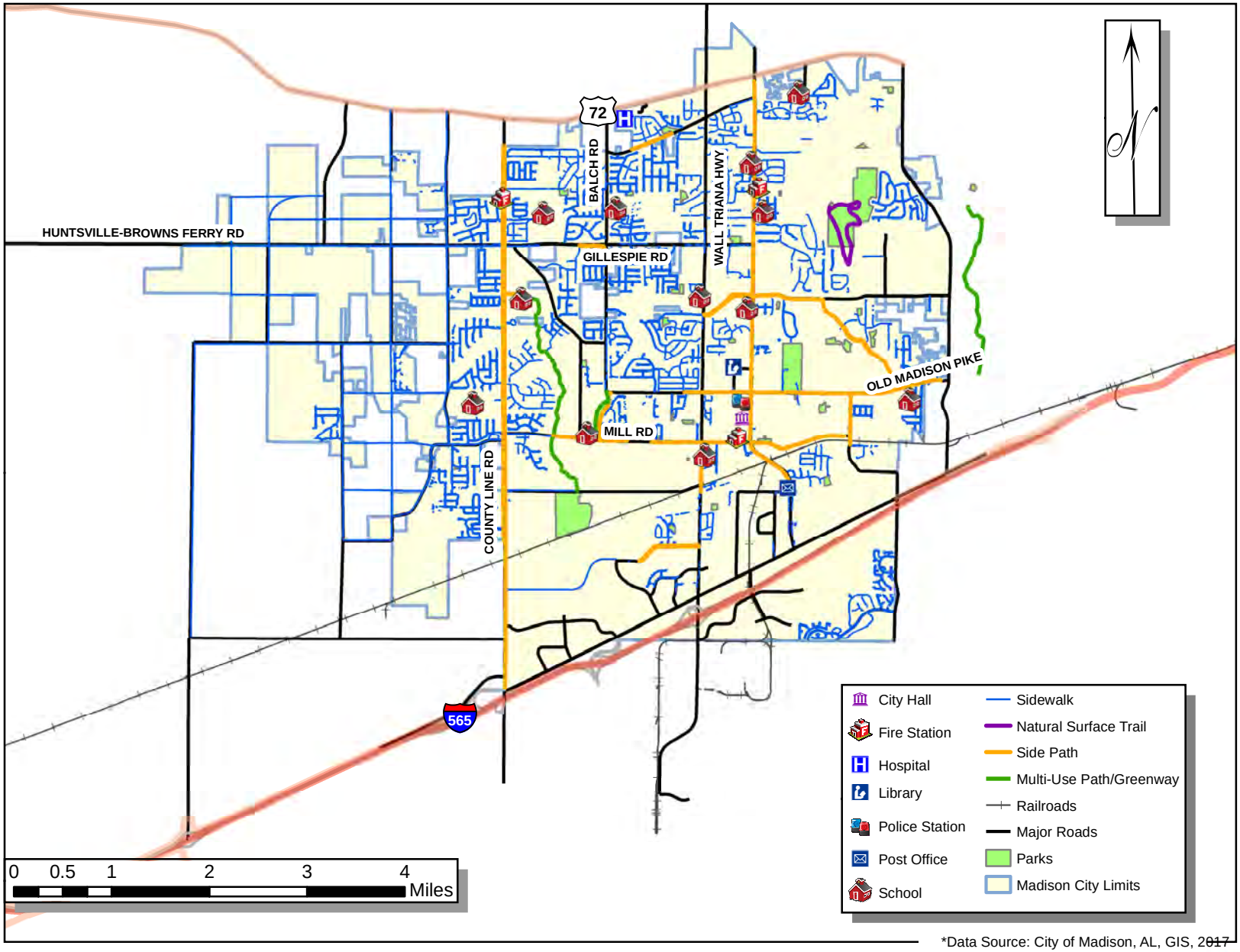
*Data Source: (City of Huntsville, AL) MPO, 2017 & City of Madison, AL, GIS, 2017

Figure 3-4: Existing Bicycle and Pedestrian Facilities



*Data Source: City of Madison, AL, GIS, 2017

Figure 3-5 :Existing Bicycle and Pedestrian Connectivity



*Data Source: City of Madison, AL, GIS, 2017

Another consideration for sidewalks involves compliance with the Americans with Disabilities Act (ADA). The City adopted an ADA Transition Plan in 2016 that identifies pedestrian facilities within the public right-of-way. The City has a current inventory of 220 miles of concrete or asphalt sidewalks, generally 4 to 5 feet wide. There are also approximately 1,772 concrete curb ramps, at a width of 4 feet (excluding flared sides). Of the 42 signalized intersections maintained by the City, 20 have pedestrian accessibility.

The City is aggressively undertaking the expansion of pedestrian and bicycle facilities along its higher volume roadways. Much of Hughes Road between Highway 72 and Madison Boulevard includes a 6-foot-wide multi-use path along the western side, although gaps do exist. Recent improvements along County Line Road included installation of a 10-foot-wide multi-use path along both sides of the roadway (a total of approximately 7.5 miles) from the City's northern limit almost to Madison Boulevard. A multi-use path is also in place along Eastview Drive from Wall Triana Highway to Hughes Road.

In addition to facilities alongside roadways, the City manages and maintains a paved walking trail in Dublin Memorial Park, as well as two multi-use greenway trails:

- Bradford Creek Greenway – Travels 2.3 miles from Palmer Park at Palmer Road to Heritage Elementary School on County Line Road south of Gillespie Road.
- Mill Creek Greenway – Travels one-half mile from near Mill Creek Elementary School on Mill Road, past Mill Creek Dog Park, to Browns Ferry Road.

In the eastern portion of the City of Madison, the trails at Rainbow Mountain Preserve are managed and maintained by the Land Trust of North Alabama. Consisting of five hiking trails totaling approximately three miles, access is provided on the western side via the Rainbow Mountain Trailhead at Stoneridge Park off Stoneway Trail or on the eastern side via Oakhurst Drive.

Located immediately east of Madison, Indian Creek Greenway is managed and maintained by the City of Huntsville. Currently composed of two disconnected segments, the main (southern) section begins at Madison Pike east of Slaughter Road, between Madison Academy and St. John Paul II Catholic High School. It parallels Indian Creek northward for 2.85 miles, passing Columbia High School and ending about 0.75 mile south of University Drive (Highway 72). A spur north of Farrow Road connects to Creekwood Park's walking trails and dog park. The northern segment, also called Providence Greenway, travels one mile northward from University Drive to end behind Providence Elementary School.

3.3 PUBLIC TRANSPORTATION

Currently, there is no municipal transit service offered within the city other than the Madison Assisted Ride System (MARS). The MARS program is available for residents eligible for paratransit services under ADA guidelines. However, as travel and congestion continue to increase along the Highway 72, Hughes Road, Sullivan Street/Wall-Triana Highway, and Madison Boulevard corridors, the potential for transit demand is likely to increase.

4.0 ANALYSIS OF EXISTING AND PROJECTED CONDITIONS

This section begins with an overview of the technical analyses undertaken as part of the 2040-TP. Next, existing roadway conditions are presented and planned improvements are discussed, serving as the baseline against which projected roadway conditions and deficiencies are compared. Together, these findings lay the foundation for the subsequent development and evaluation of potential improvements. More details about the existing conditions and planned improvements can be found in the interim *Baseline Conditions and Needs Assessment Report*.

4.1 TECHNICAL ANALYSES

4.1.1 Travel Demand Modeling

Travel demand modeling is a process in which existing and projected socioeconomic (SE) data are used to forecast traffic for a given base year and projected conditions. The SE data utilized in the travel demand modeling process includes household, employment, and school enrollment numbers. The SE data are aggregated to traffic analysis zones (TAZs) – essentially neighborhoods surrounded by community streets. In a three-step process, the SE data are converted to numbers of trips, which are then distributed throughout the roadway network, and finally assigned to particular roadways based on which routings make the most sense to actual travel patterns.

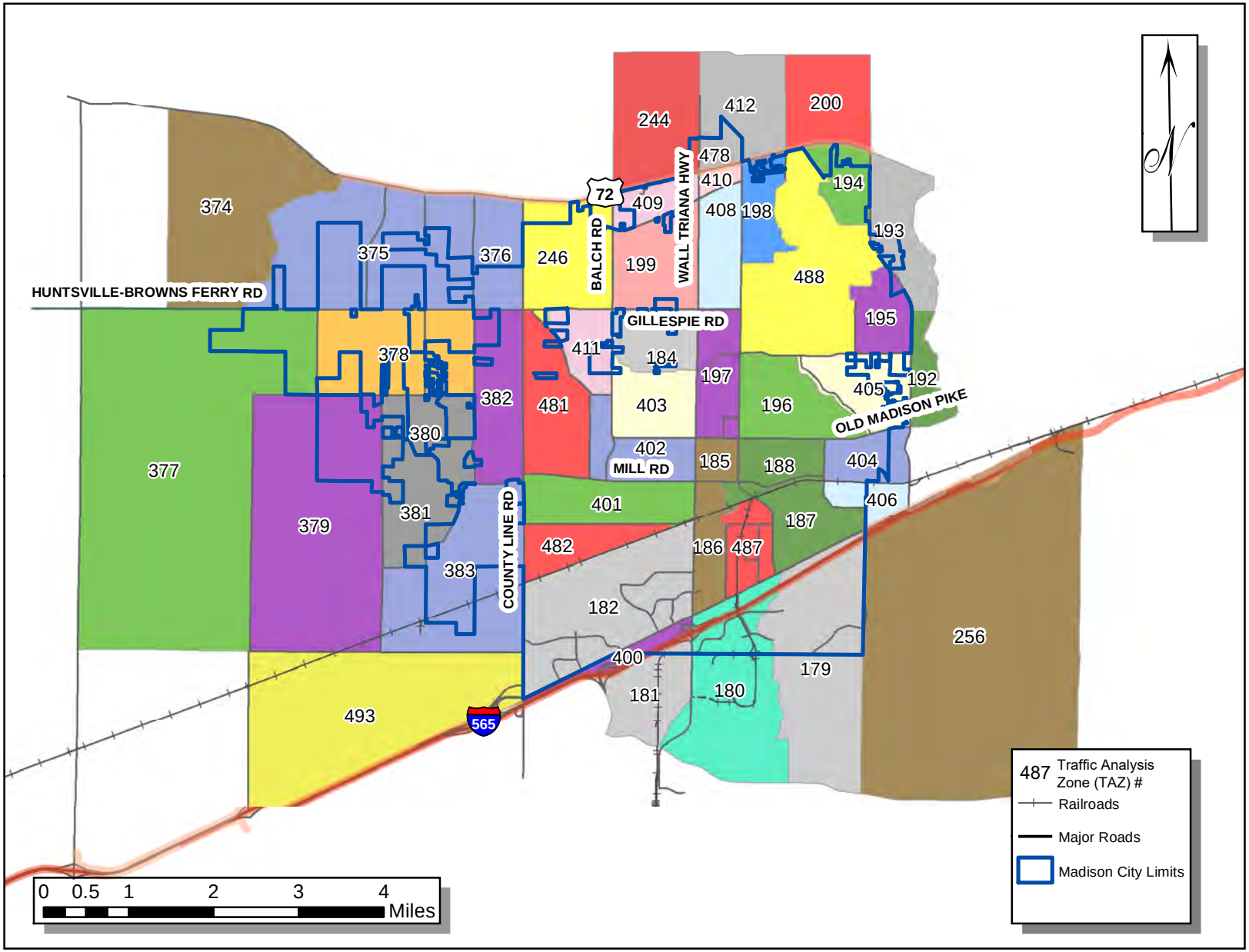
Development of the Madison 2040-TP utilized the Huntsville MPO regional travel demand model. The same TAZ boundaries were used as when the MPO develops its travel demand forecasts for the entire Huntsville region. Of the 502 TAZs within the Huntsville MPO travel demand model, 49 TAZs are fully or partially within the City of Madison. A map of the TAZ structure in relation to the Madison City limits is provided in Figure 4-1.

To accurately forecast current and projected travel demand within the City of Madison, several adjustments to the model were required. First, SE data for the City of Madison was revised to reflect input provided by City staff. To develop accurate household, employment, and school enrollment estimates throughout the city for use in the model, City staff completed a comprehensive parcel-by-parcel inventory of all existing parcels for all zoning/land use types for properties within Madison and portions of Huntsville that were within these TAZ boundaries. This exercise was undertaken to update the base year population and employment totals in the Huntsville MPO regional model, which had originally been developed with 2009 data.

After the updated 2017 SE data were incorporated into the model, an initial base year model run was completed. Several adjustments were then undertaken to correct initial model deficiencies based on coordination with City staff:

- The model's roadway network was expanded to add several roadways of key interest within the Madison study area.
- The distribution of trips across the model network was also examined to ensure the accuracy of connectors so that trips would load onto the correct roadways.
- Roadway capacities were updated to reflect the increased capacity offered by three-/five-lane cross sections (typically for center turn lanes) and left turn lanes along several corridors.

Figure 4-1: TAZ Structure within the City of Madison



*Data Source: City of Huntsville (Huntsville MPO) GIS, 2017

- Travel speeds were adjusted to improve traffic assignment. The speeds incorporated into the final model runs fall between the posted speed limits (which are too high during congested conditions) and the evening peak hour travel speeds (which are too low during other portions of the day).
- The number of trips per household was adjusted (increased) to better reflect realistic trip making for a community characterized by higher income, two to three-car households.

After incorporating the model modifications and validating the base year (2017) model results, additional model runs were conducted to provide travel forecasts for years 2025 and 2040. The final results of the modeling process included existing and projected traffic volumes, congestion levels (volume to capacity ratios), total trips, and vehicle miles of travel.

More detailed information on the travel demand modeling process, modifications, activities and results is provided in Appendix A. An overview of the existing and projected distribution of households and employment was presented previously in Section 2. Discussions of the existing and projected roadway volumes and congestion, as well as the deficiencies indicated by those conditions, are presented later in this section.

4.1.2 Intersection Analysis

One shortfall of measuring congestion by daily volumes and volume-to-capacity (V/C) ratio is that peak hour deficiencies and localized operational improvements are often not accurately reflected. Depending on the nature and location of deficiencies, intersection improvements can offer lower cost and/or more quickly implemented alternatives to roadway widening projects.

An assessment of needs at key intersections throughout the city was conducted. The City Engineer provided a list of 14 critical intersections to be analyzed. The intersection analysis took into account the current 2017 traffic counts and growth predicted in the 2025 model runs and was based on peak hour traffic conditions and turn movement demand. The assessment identified potential improvements to mitigate existing and projected operational deficiencies.

The 14 intersections analyzed included:

- Highway 72 at Wall Triana Highway
- Madison Boulevard at Wall Triana Highway
- Madison Boulevard at Zierdt Road
- Hughes Road at Eastview Drive
- Hughes Road at Old Madison Pike/Browns Ferry Road
- Wall Triana Highway at Eastview Drive
- Wall Triana Highway at Gillespie Road
- Gillespie Road at Balch Road
- Sullivan Street/Wall Triana Highway at Browns Ferry Road
- Sullivan Street at Mill Road
- Sullivan Street at Palmer Road
- County Line Road at Gillespie Road
- County Line Road at Mill Road
- County Line Road at Madison Boulevard

The intersection analysis results are summarized by corridor within the corridor assessment presented in Section 5. More information on the analysis methodology and results is provided in Appendix A.

4.2 EXISTING ROADWAY CONDITIONS

Traffic conditions are determined using two components: volume and capacity. Volume is generally reported as Annual Average Daily Traffic (AADT) and provides insight regarding demand on the system. Levels of congestion are developed by comparing the traffic volumes against roadway capacities to indicate how well the system is functioning and to identify locations where the transportation network is over capacity. These two factors – the number of trips along the roadway network and the ability of the facilities to accommodate these trips – are also the two primary indicators of roadway deficiencies.

4.2.1 Existing Traffic Volumes

In 2017, the City of Madison collected updated traffic counts at specific locations to establish base year volumes. Most higher volumes (17,000 to 23,500 AADT) were found on the north-south roadways of Wall Triana Highway, County Line Road, and Hughes Road. East-west, Highway 72 carries the most traffic, with volumes ranging from 23,000 AADT west of County Line Road to over 42,000 AADT east of Hughes Road. Madison Boulevard carries volumes ranging from 18,000 to 29,000 AADT, with higher volumes on the eastern portion near Zierdt Road. Old Madison Pike also has volumes ranging from 10,000 to 16,000 trips per day. The existing roadway volumes are presented in Figure 4-2.

4.2.2 Existing Levels of Congestion

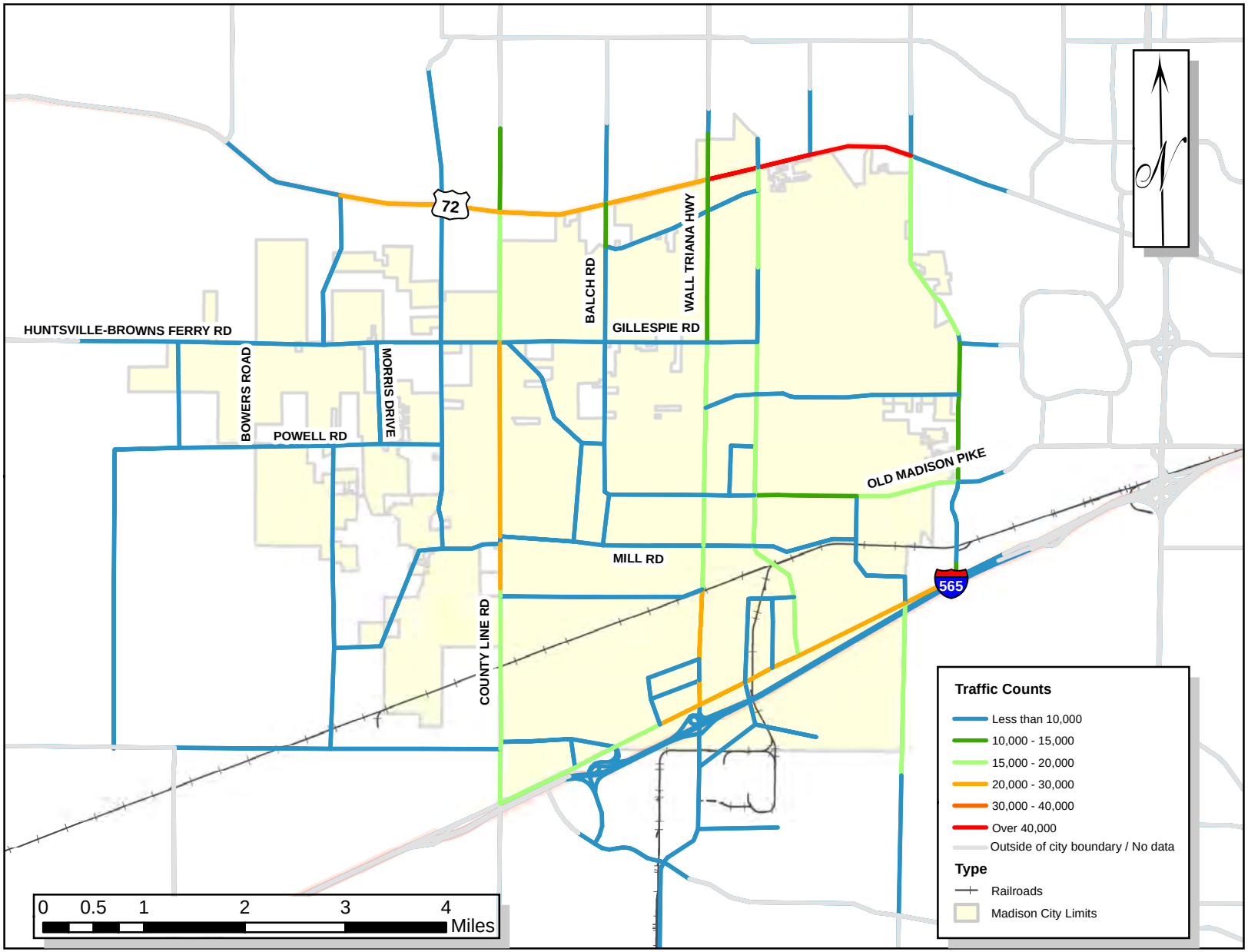
Congestion is commonly assessed by comparing a roadway segment's traffic volumes (V) to its carrying capacity (C). The resulting level of service (LOS) is assigned a "grade" of A (best) through F (worst). The LOS thresholds can vary, but segments in urban areas are typically considered congested when V/C ratios reach 1.00 or greater, or an LOS of E or F. Table 4-1 defines LOS levels for the 2040-TP analysis.

Table 4-1: Levels of Service Description

Level of Service	V/C Ratio	Traffic Conditions
LOS A-C	<.85	Ranging from free flow to stable flow. Most experienced drivers are comfortable, roads remain safely below but efficiently close to capacity, and posted speed is maintained. Minor incidents will have localized impacts.
LOS D	.8501 – 1.000	Approaching unstable flow. Speeds slightly decrease as traffic volumes slightly increase. Freedom to maneuver within the traffic stream is much more limited and driver comfort levels decrease. Minor incidents are expected to create delays. This is commonly the threshold for acceptable conditions in urban areas during peak hours.
LOS E	1.001 – 1.15	Unstable flow, operating at capacity. Flow becomes irregular and speed varies rapidly because there are essentially no usable gaps to maneuver in the traffic stream and speeds rarely reach the posted limit. Any disruption to traffic flow, such as merging ramp traffic or lane changes, will create a shock wave affecting traffic upstream. Any incident will create serious delays.
LOS F	>1.15	Forced or breakdown flow. Every vehicle moves in lockstep with the vehicle in front of it, with frequent slowing required. Travel time cannot be predicted, with generally more demand than capacity. A road in a constant traffic jam is at this LOS because LOS is an average or typical service rather than a constant state. For example, a highway might be at LOS D for the AM peak hour, but have traffic consistent with LOS C some days, LOS E or F others, and come to a halt once every few weeks.

Source: American Association of State Highway Transportation Officials (AASHTO)

Figure 4-2: 2017 Roadway Volumes (from Traffic Counts)



*Data Source: City of Madison, 2017

Existing levels of congestion were developed by applying the traffic count data (as provided by the City) to the current roadway capacities (as adjusted in the 2040-TP travel demand modeling process). The V/C ratios generated from this exercise are shown in Figure 4-3. Base year congestion highlights indicate:

- Currently, Highway 72 from Hughes Road to Slaughter Road is the only roadway segment operating under congested conditions. It is scheduled for widening by 2025.
- Other roadway segments currently approaching congested conditions, and therefore experiencing peak hour congestion, are:
    - Zierdt Road south of I-565 (widening in progress)
    - Sullivan Street from Madison Boulevard to Palmer Road
    - Wall Triana Highway from Browns Ferry Road to Eastview Drive
    - Madison Boulevard from Zierdt Road to Slaughter Road
    - Hughes Road from Old Madison Pike to Eastview Drive
    - Slaughter Road from Highway 72 to Old Madison Pike (widening planned by 2040)

4.2.3 Safety

The 2040-TP development process included a review of safety data obtained from the University of Alabama's Critical Analysis Reporting Environment (CARE) database. Table 4-2 provides the number of crashes within the City of Madison by severity for the years 2010-2014. A higher crash severity can indicate more unsafe conditions and/or higher travel speeds along a particular roadway network. The "unknown" category indicates that the reporting officer did not make a comment on the severity of the crash and/or the form was incorrectly completed. The analysis also compared data on crashes within the City of Madison municipal limits to that within Madison County as a whole. In summary:

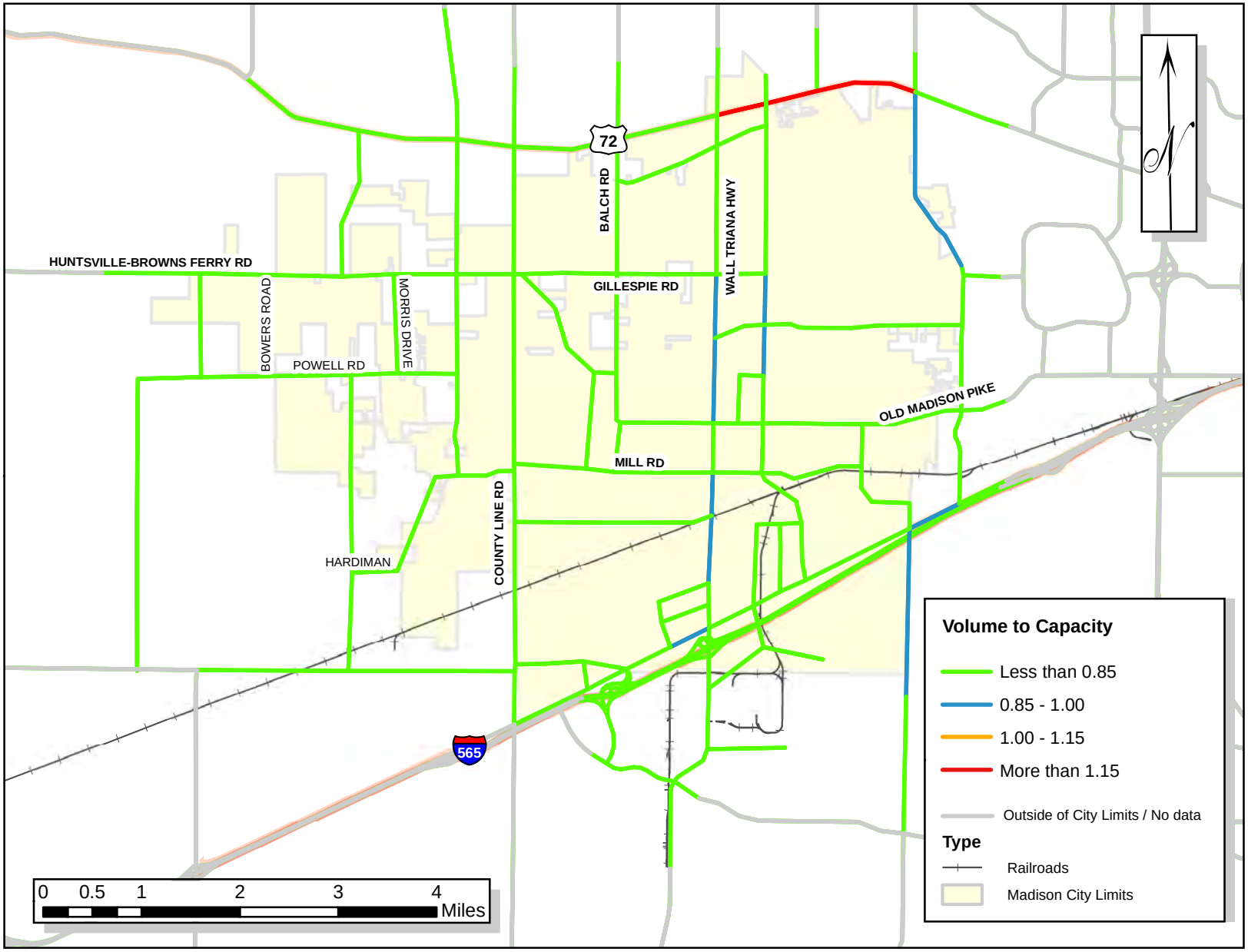
- Approximately 80 percent of the city's crashes did not result in injury. This is slightly higher than the county's 76 percent.
- The county had approximately twice the percentage of fatality crashes as the city.
- There were approximately 5,400 crashes in the City of Madison during the five-year period, averaging 1,080 crashes per year.

Table 4-2: Crashes by Severity, 2010-2014

Severity	City of Madison							Madison County	
	2010	2011	2012	2013	2014	Total	Percentage	2010-2014 Total	Percentage
Fatal Injury	1	2	5	1	0	9	0.17%	182	0.36%
Incapacitating Injury	27	25	27	23	18	120	2.22%	1,710	3.37%
Non-Incapacitating Injury	98	69	61	67	84	379	7.01%	4,410	8.69%
Possible Injury	84	93	96	111	146	530	9.80%	4,547	8.96%
Property Damage Only	791	778	902	886	907	4,264	78.88%	38,526	75.95%
Unknown	31	37	21	8	7	104	1.92%	1,354	2.67%
Total	1,032	1,004	1,112	1,096	1,162	5,406	100.00%	50,729	100.00%

Source: University of Alabama, CARE Data, 2010-2014

Figure 4-3: 2017 Estimated Congestion Levels



*Data Source: JRWA, 2017

Per ALDOT policy, CARE data related to specific crash locations cannot be published. However, a review of the data for 2011-2016 indicates that many crashes occur along corridors that experience higher traffic volumes, including Highway 72, Wall Triana Highway, Hughes Road, and Madison Boulevard.

Table 4-3 shows the number of bicycle and pedestrian crashes throughout the city from 2010 to 2014. Of particular note:

- Pedestrian or bicyclist involved crashes were few, totaling 20 for pedestrians and 15 for bicyclists.
- Little difference in the ratio of pedestrian and bicycle involved crashes is seen between the City of Madison and Madison County.

Table 4-3: Pedestrian and Bicyclist Involved Crashes, 2010-2014

Severity	City of Madison							Madison County	
	2010	2011	2012	2013	2014	Total	Percentage	2010-2014 Total	Percentage
1 Pedestrian Involved	6	4	3	5	1	19	0.35%	313	0.62%
2 Pedestrians Involved	0	0	0	1	0	1	0.02%	12	0.02%
No Pedestrians Involved	1,026	1,000	1,109	1,090	1,161	5,386	99.63%	50,403	99.36%
1 Bicyclist Involved	0	2	1	3	9	15	0.28%	138	0.27%
No Bicyclists Involved	1,032	1,002	1,111	1,093	1,153	5,391	99.72%	50,590	99.73%

Source: University of Alabama, CARE Data, 2010-2014

From 2011-2016, bicycle crash locations were fairly widespread. However, pedestrian crashes occurred primarily along the roadways with higher traffic volumes and automobile crashes – Highway 72, Wall Triana Highway, Hughes Road, and Madison Boulevard. It should be noted that statistics are not taken for crashes between bicyclists and pedestrians because no auto is involved.

4.3 PLANNED IMPROVEMENTS

Planned improvements identified in previous studies and/or policy documents provide a good baseline as potential alternatives for solving transportation issues throughout the city. This is especially true for relatively recent studies as they should be geared to solving issues and needs that are still prevalent. The sources inventoried for planned and programmed improvements include the following:

- Huntsville MPO Improvements – Contains a list of programmed (funded), fiscally-constrained long-term projects and visionary projects for the Huntsville region included in the MPO's current Long Range Transportation Plan (LRTP), as well as information provided by subsequent project updates through July 2017.
- Madison Growth Plan – Contains a number of smaller-scale focused area improvements to further the Key Development Areas (KDAs) specific recommendations identified in the Plan.
- West Side Master Plan – Identifies roadway improvements in the western portion of the city.
- 2025 Transportation Master Plan – Identifies prioritized projects based on 2001 conditions, many of which are still needed.

The improvements recommended within these reports were reviewed for inclusion in the listing of potential projects considered for the 2040-TP, which is discussed later in this section. A more in-depth review of previous studies is provided in the interim *Baseline Conditions and Needs Assessment Report*.

4.3.1 Huntsville MPO Improvements

The Huntsville MPO 2040 LRTP, adopted in 2016, identifies prioritized improvements throughout the Huntsville MPO planning area, including in and around the City of Madison. The initial list of improvements within the LRTP has been amended by the MPO to reflect changes in the work plans from ALDOT. Improvements are grouped in two categories:

- Fiscally-constrained – Projects anticipated to have funding and be completed by 2040
- Visionary – Needed improvements with no funding anticipated prior to 2040

In reviewing the fiscally-constrained projects in the MPO work plan through 2040, the most important improvements for the City of Madison would be:

- Highway 72 widening from County Line Road to Providence Main Boulevard from four to six lanes (ALDOT project) – This project would enable Highway 72 to carry more traffic, potentially easing the burden on east-west roadways throughout Madison. However, the construction date for this improvement is under evaluation by ALDOT due to costs associated with the current widening design.
- I-565 new interchange near Zierdt Road – This project is being completed by a private developer and, to date, all of the funding has not been secured. Part of the Town Madison development plan, the new interchange would provide more mobility options along Madison Boulevard and nearby roadways.
- Slaughter Road widening from Highway 72 to Madison Boulevard – Sponsored by the City of Huntsville, this project will provide congestion relief on Madison's eastern side.

Significant visionary projects that would impact traffic within the City of Madison include:

- Old Madison Pike widening from three to four lanes from Hughes Road to Slaughter Road – Adds capacity to a corridor that carries significant commuter traffic during peak hours.
- Huntsville-Browns Ferry Road widening from two to four lanes from Mooresville Road to County Road Line – Adds capacity in the city's high growth West Side area.
- Mill Road widening from two to four lanes from County Line Road to Hughes Road – Increases east-west connectivity through the city.
- Balch Road extension as a four-lane roadway from Browns Ferry Road to Madison Boulevard – Provides greater connectivity in the growing West Side area.
- Wall Triana Highway widening from two to four lanes from Highway 72 to Mill Road – Adds capacity on a roadway segment projected to be congested.
- Hughes Road widening from three to four lanes from Old Madison Pike to Highway 72 – Helps in accommodating north-south traffic from Madison Boulevard to Highway 72, particularly during the peak hour.

Table 4-4 and Figure 4-4 show the Huntsville MPO's planned and programmed improvements.

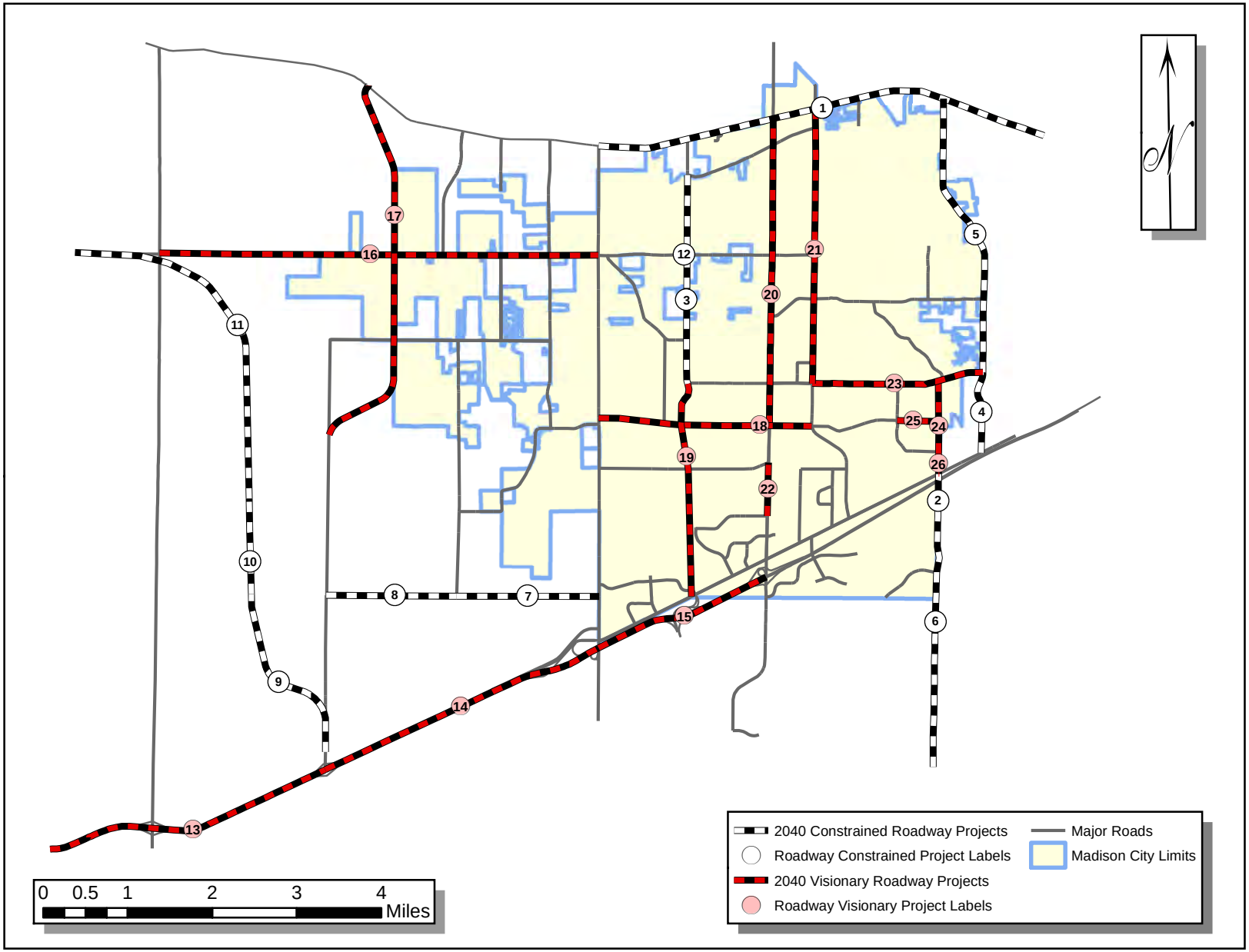
Table 4-4: Huntsville MPO Planned and Programmed Improvements

2040-TP Map #	Project Type	Project Description	Construction Year* (LRTP)
1	Capacity	Widen Highway 72 from 4 to 6 lanes from County Road Line to Providence Main Boulevard	2016
2	Maintenance and Operations	Construct Interchange on I-565 near Zierdt Road	2015
3	Capacity	Widen Balch Road from 2 to 4 lanes from Browns Ferry Road to Gooch Lane**	2030
4	Capacity	Widen Slaughter Road from 2 to 4 lanes from Old Madison Pike to Madison Boulevard	2023
5	Capacity	Widen Slaughter Road from 2 to 4 lanes from Highway 72 to Old Madison Pike	2036
6	Capacity	Widen Zierdt Road from 2 to 4 lanes from US Alternate 72 to Martin Road	2015
7	Capacity	Widen Old Highway 20 from 2 to 4 lanes from County Line Road to Segers Road	2016
8	Capacity	Widen Old Highway 20 from 2 to 4 lanes from Segers Road to Greenbrier Road	2022
9	New Roadway	Greenbrier Parkway as a 4-lane roadway from I-565 to Old Highway 20	2016
10	New Roadway	Greenbrier Parkway as a 4-lane roadway from Old Highway 20 to 5000' north of Old Highway 20	2016
11	New Roadway	Greenbrier Parkway as a 4-lane roadway from 5000' north of Old Highway 20 to Huntsville-Browns Ferry Road	2020
12	Maintenance and Operations	Roundabout installation at Balch Road and Gillespie Road	NA
NA	Maintenance and Operations	Resurfacing Highway 72 from Balch Road to Hughes Road	NA
13	Capacity	Widen I-565 from 4 to 6 lanes from east of I-65 to Greenbrier Road	Visionary (Beyond 2040)
14	Capacity	Widen I-565 from 4 to 6 lanes from Greenbrier Road to Madison County Line	Visionary (Beyond 2040)

2040-TP Map #	Project Type	Project Description	Construction Year* (LRTP)
15	Capacity	Widen I-565 from 4 to 6 lanes from Madison County Line to Wall Triana Highway	Visionary (Beyond 2040)
16	Capacity	Widen Huntsville-Browns Ferry Road from 2 to 4 lanes from Mooresville Road to County Road Line	Visionary (Beyond 2040)
17	New Roadway	Powell Road Extension as a 4-lane road from Powell Road to Holladay Drive	Visionary (Beyond 2040)
18	Capacity	Widen Mill Road from 2 to 4 lanes from County Line Road to Hughes Road	Visionary (Beyond 2040)
19	New Roadway	Extending Balch Road as a 4-lane roadway from Browns Ferry Road to Madison Boulevard	Visionary (Beyond 2040)
20	Capacity	Widen Wall Triana Highway from 2 to 4 lanes from Highway 72 to Mill Road	Visionary (Beyond 2040)
21	Capacity	Widen Hughes Road from 3 to 4 lanes from Old Madison Pike to Highway 72	Visionary (Beyond 2040)
22	Capacity	Widen Sullivan Street from 3 to 4 lanes from Royal Street to Front Street	Visionary (Beyond 2040)
23	Capacity	Widen Old Madison Pike from 3 to 4 lanes from Hughes Road to Slaughter Road	Visionary (Beyond 2040)
24	New Roadway	Extend Zierdt Road as a 2-lane roadway from 1 mile north of Madison Boulevard to Old Madison Pike	Visionary (Beyond 2040)
25	New Roadway	Extend Portal Lane as a 2-lane road from Shelton Road to Zierdt Road Extension	Visionary (Beyond 2040)
26	Capacity	Widen Shelton Road from 2 to 4 lanes from Madison Boulevard to 1/4 mile north of Madison Boulevard	Visionary (Beyond 2040)

**Reflects year in 2040 Huntsville Long Range Transportation Plan (LRTP); NA = Not in LRTP*
***Project changed to 2-foot widening to enhance safety*

Figure 4-4 : Huntsville MPO Planned and Programmed Improvements



*Data Source: (City of Huntsville, AL) MPO, 2017

4.3.2 Madison Growth Plan Improvements

Improvements specifically called out in the 2012 City of Madison Growth Plan were classified as:

- Intermediate (within the next 12 months)
- Short-Term (within the next 3 years)
- Mid-Term (3 to 7 years)
- Long-Term (7 to 12 years)

Identified transportation improvements and their rationale include:

- Highway 72 roadway enhancements (mid-term) – Certain key segments of Highway 72 may warrant physical enhancements like widening or lane reconfiguration, although additional coordination will be required because it is a State Route and adding capacity is more expensive than other operations focused strategies.
- I-565 interchange planning and implementation (short- and mid-term) – Initiate discussions with ALDOT and preliminary studies for a new I-565 interchange as recommended in the City's Growth Plan.
- Madison Boulevard streetscape improvements (mid-term) – Support redevelopment along the corridor with aesthetic improvements including adding trees, lights and plantings, mandating more consistent signage, upgrading the pedestrian/bicycle environment, and improving bicycle/pedestrian connections between downtown, Madison Boulevard, and Hughes Road.
- Old Madison Pike Roadway enhancements (mid-term) – Maintain and improve automobile capacity with targeted enhancements like bridge widening and adding turn/deceleration lanes, while also maintaining and improving traffic flow through access management techniques.
- Sullivan Street/Wall Triana Highway roadway enhancements (long-term) – Investigate methods to improve traffic operations along the corridor, particularly in the segment immediately adjacent to the Historic Downtown.
- Mill Road realignment at County Line Road (long-term) – Consider realignment strategies for a true four-way intersection to improve operations and flow at this off-set intersection.

4.3.3 West Side Master Plan Improvements

The West Side Master Plan recommended 11 specific roadway projects to improve connectivity throughout the area:

- Improve Huntsville-Browns Ferry Road from a two-lane road to a four-lane parkway with center turn pockets and median.
- Create a new minor collector from Hardiman Road to Segers Road to serve as an additional east-west connection.
- Improve Burgreen Road from Hardiman Road to Highway 72 from a two-lane road to a two-lane road with center turn pockets and median, with roundabouts at the intersections with Hardiman Road and Powell Road.
- Create a new local road that connects Morris Drive to Henderson Lane.
- Improve Segers Road from Powell Road south to the intersection of the new east-west connector road between Hardiman and Segers, with a roundabout at the intersection with Powell Road.

- Improve Hardiman Road from a two-lane road to a two-lane road with center turn pockets and median from Burgreen Road to Segers Road.
- Improve the east-west portion of Powell Road from Burgreen Road from a two-lane road to a two-lane road with center turn pockets and median.
- Create a new road that connects the north-south portion of Powell Road north to Holladay Boulevard via Bowers.
- Create a new road that connects to Highway 72 west of Holladay Boulevard.
- Create a north-south roadway that connects Hardiman Road to Morris Drive.
- Create a new east-west connection from the vicinity of Cedar Acres Drive to Acorn Way.

These roadways are shown in the West Side Master Plan Vision Map, included previously as Figure 2-8.

4.3.4 Madison 2025 Transportation Master Plan Improvements

Some of the projects recommended in the 2025 Transportation Master Plan have been completed or carried forward into more recent plans. Other projects that may warrant consideration for the future include:

- High Priority
  - Extend Balch Road from Mill Road to Madison Boulevard
- Medium Priority
  - Extend Royal Drive from Westchester Road to Balch Road Extension (not possible until completion of Balch Road extension to Madison Boulevard)
  - Extend Portal Lane from Shelton Road to Zierdt Road
  - Modify the I-565 interchange at Huntsville International Airport

4.3.5 Bicycle and Pedestrian Facility Improvements

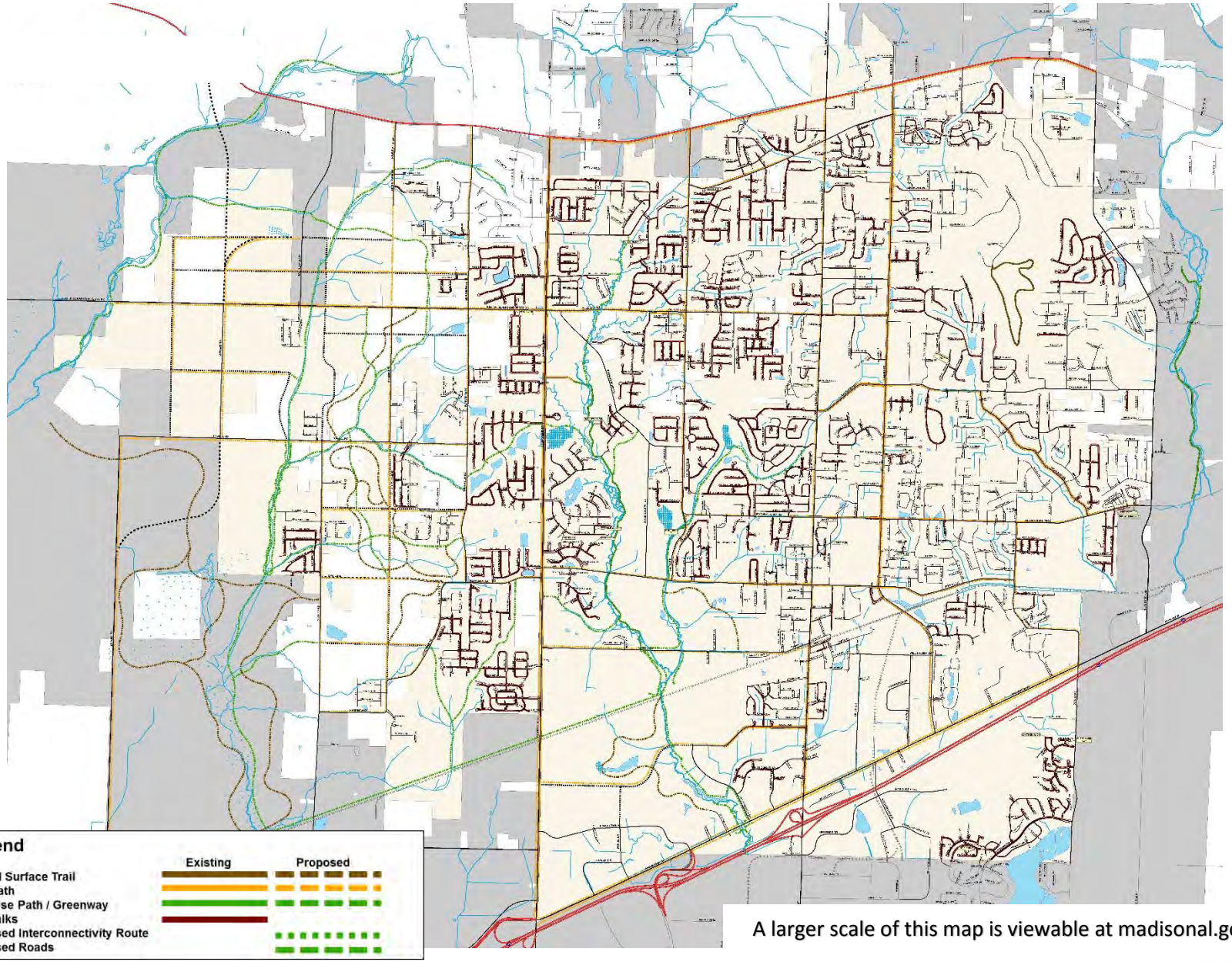
As indicated previously, the City is aggressively undertaking and planning for future expansion of pedestrian and bicycle facilities along its higher volume roadways. The *2025 Greenway and Trails Master Plan* outlines specific non-vehicular improvements by project location and type and prioritizes them into one of three groups for future implementation.

In addition, the City of Huntsville will continue expanding its bicycle/pedestrian network in the vicinity of Madison with the construction of several more planned and programmed facilities:

- Zierdt Road – Bicycle lanes southbound to Martin Road were recently completed, with northbound lanes to be included in a future phase.
- Betts Spring Branch – Greenway located south of Madison between I-565, Redstone Arsenal, Martin Road and Huntsville International Airport, within The Reserve development.
- Barren Fork Creek/Miller Branch – Greenway south of Martin Road with future connection to Betts Spring Branch Greenway.
- Knox Creek – Greenway north of Highway 72 connecting east-west between Wall Triana Highway and the future Limestone Creek Greenway.

Figure 4-5 shows bicycle and pedestrian facilities that are currently planned or under consideration in Madison. These facilities will serve as the baseline for a comprehensive City of Madison bicycle and pedestrian network vision, to be developed by City staff following completion of the 2040-TP.

Figure 4-5: Planned Bicycle and Pedestrian Facilities



4.4 PROJECTED CONDITIONS AND NEEDS

Future conditions and needs are determined through a combination of technical assessments (travel demand modeling and intersection analyses) and qualitative reviews. The findings of these assessments with regard to projected conditions and deficiencies are presented in the following pages.

4.4.1 Future Roadway Improvements

In order to develop a reasonable and accurate forecast of future roadway conditions, it is necessary that the travel demand model include planned roadway improvements that will affect capacity, connectivity, and/or operations along key roadways throughout the city. Table 4-5 lists the projects assumed for both the 2025 and 2040 model runs.

Table 4-5: Improvements Assumed within the 2025 and 2040 Model Runs

Project Type	Project Description	Construction Year* (LRTP)	2025 E+C	2040 E+C	Comments from Project Sponsors (Huntsville MPO and/or ALDOT)
Capacity	Widen Highway 72 from 4 to 6 lanes from County Road Line to Providence Main Boulevard	2016	X	X	Project delayed; construction year 2019 (MPO)
Capacity	Widen Slaughter Road from 2 to 4 lanes from Old Madison Pike to US Alternate 72	2023		X	Pushed back to 2028 (MPO)
Capacity	Widen Slaughter Road from 2 to 4 lanes from Highway 72 to Old Madison Pike	2036		X	Moved up to 2034 (MPO)
Capacity	Widen Zierdt Road from 2 to 4 lanes from US Alternate 72 to Martin Road	2015	X	X	Nearly complete
Capacity	Widen Old Highway 20 from 2 to 4 lanes from County Line Road to Segers Road	2016	X	X	Design underway; City anticipates project online by 2025 (City of Huntsville)
Capacity	Widen Old Highway 20 from 2 to 4 lanes from Segers Road to Greenbrier Road	2022	X	X	Design underway; City anticipates project online by 2025 (City of Huntsville)
New Roadway	Greenbrier Parkway as a 4-lane roadway from I-565 to Old Highway 20	2016	X	X	Design underway; City anticipates project online by 2025 (City of Huntsville)
New Roadway	Greenbrier Parkway as 4-lane roadway from Old Highway 20 to 5000' north of Old Highway 20	2016	X	X	Design underway; City anticipates project online by 2025 (City of Huntsville)

Project Type	Project Description	Construction Year* (LRTP)	2025 E+C	2040 E+C	Comments from Project Sponsors (Huntsville MPO and/or ALDOT)
New Roadway	Greenbrier Parkway as a 4-lane roadway from 5000' north of Old Highway 20 to Huntsville-Browns Ferry Road	2020	X	X	Design underway; City anticipates project online by 2025 (City of Huntsville)
New Roadway	Greenbrier Parkway as a 4-lane roadway from Huntsville-Browns Ferry Road to I-65	2016	X	X	Design underway; City anticipates project online by 2025 (City of Huntsville)

**Reflects year in 2040 Huntsville Long Range Transportation Plan (LRTP)*

4.4.2 Projected Traffic Volumes

To determine future roadway volumes, future year model runs for 2025 and 2040 were developed based on the projected socioeconomic data provided by the City. Then, growth factors between the 2017 and future year model volumes were applied to the traffic counts taken by the City to determine projected volumes for 2025 and 2040.

Table 4-6 shows the projected number of trips and vehicle miles of travel for 2025 and 2040 as compared to 2017, as well as the percentage increases those numbers reflect. As shown:

- Overall travel throughout Madison is projected to double by 2040.
- The bulk of growth in travel demand is projected to occur by 2025.

Table 4-6: Projected Number of Trips and Vehicle Miles of Travel, 2025 and 2040

	2017	2025	2040	2017-2025 % Change	2025-2040 % Change	2017-2040 % Change
Total Trips	516,158	942,109	1,025,620	82.5%	8.9%	98.7%
Total Vehicle Miles of Travel	1,909,001	3,425,350	3,729,117	79.4%	8.9%	95.3%

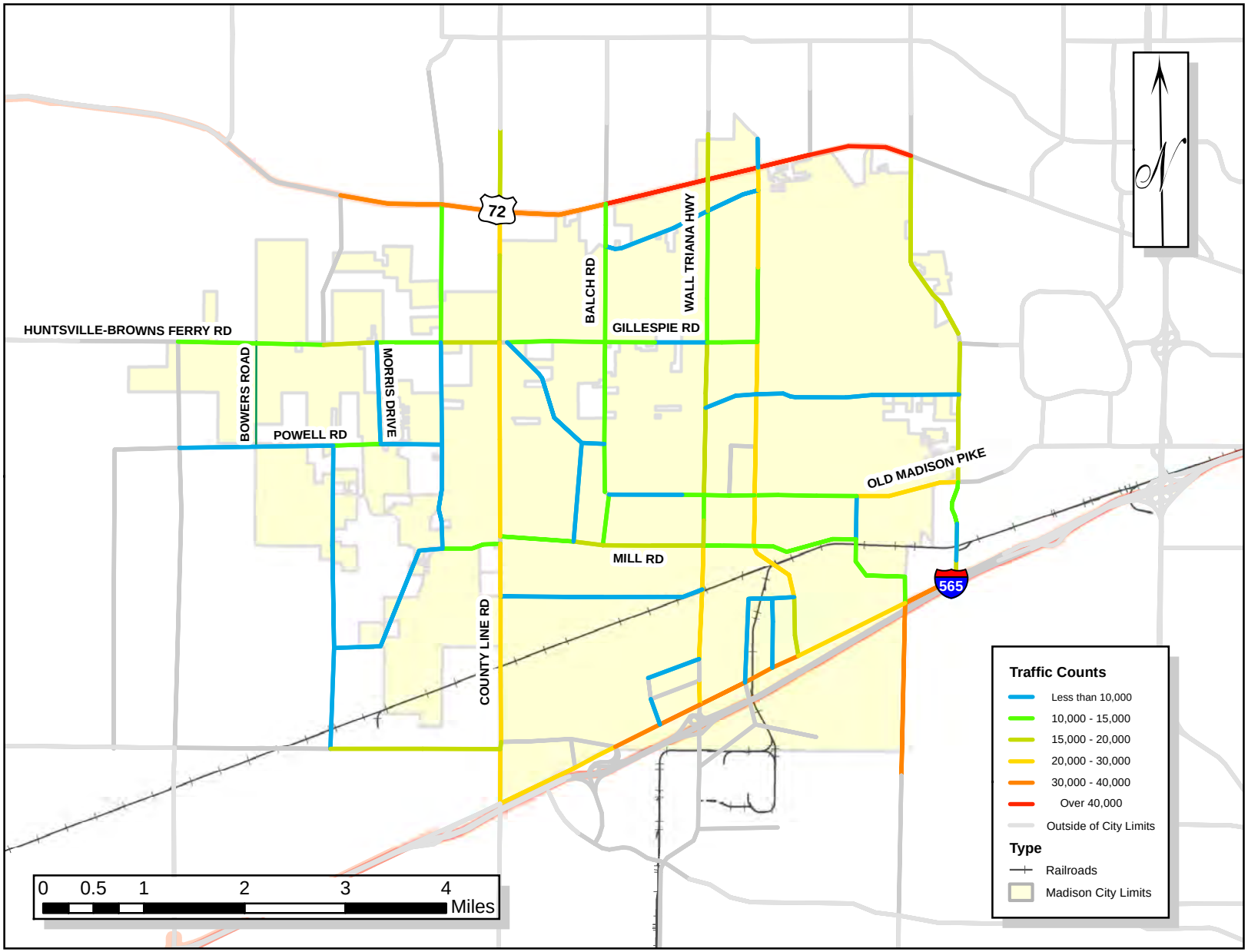
Source: City of Madison 2040-TP Travel Demand Model

The projected roadway volumes for 2025 and 2040 are shown in Figures 4-6 and 4-7, respectively. Major trends throughout the city include:

- Highway 72 and Madison Boulevard will continue to serve the most east-west traffic. However, east-west traffic is also projected to result in significant volumes along Old Madison Pike, Huntsville-Browns Ferry Road, Gillespie Road, and Mill Road by 2025.
- There is a fairly even distribution of traffic along the city's major north-south corridors – County Line Road, Sullivan Street/Wall Triana Highway, Hughes Road and Slaughter Road. That trend is expected to continue through 2040.
- South of Madison Boulevard, volumes along Zierdt Road are expected to more than double with the development of Town Madison and growth at Redstone Arsenal.

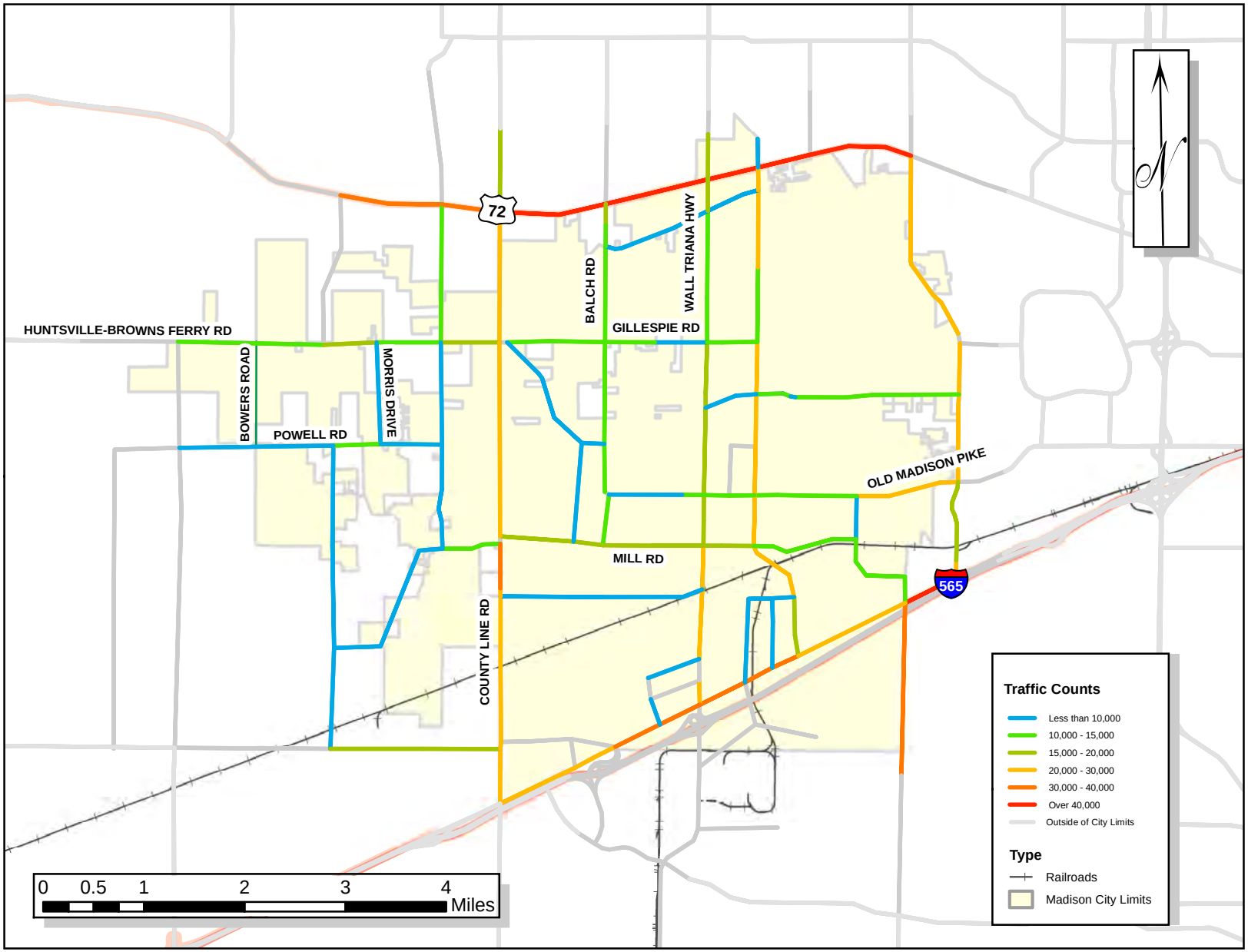
More details on projected traffic volume are provided in the corridor assessment in Section 5.

Figure 4-6: 2025 Projected Roadway Volumes



*Data Source: JRWA, 2018

Figure 4-7: 2040 Projected Roadway Volumes



*Data Source: JRWA, 2018

4.4.3 Projected Congestion Levels

Future levels of congestion were determined by assigning the projected future roadway volumes to the 2025 and 2040 roadway networks and calculating future V/C ratios. This analysis predicts how congestion levels will change given anticipated growth and programmed improvements. The results assist in prioritizing improvements recommended for the 2040-TP.

The projected roadway levels of congestion for 2025 and 2040 are provided in Figures 4-8 and 4-9, respectively. The most congested roadway segments (V/C => 1.15) by 2025 (with completion of the Highway 72 and Zierdt Road widenings) are projected to be:

- Madison Boulevard from Zierdt Road to Slaughter Road
- Zierdt Road south of I-565 (with four-lane widening)
- Sullivan Street from Madison Boulevard to Palmer Road
- Highway 72 from Hughes Road to Slaughter Road (with six-lane widening)

Other roadway segments projected to experience congestion (at least in the peak hours) by 2025 are:

- Hughes Road from Old Madison Pike to Eastview Drive
- Slaughter Road from Highway 72 to Eastview Road (widening planned by 2040)
- Highway 72 from Holladay Boulevard to County Line Road (four-lane segment)
- Madison Boulevard from Wall Triana Highway to Hughes Road
- Hughes Road from Gillespie Road to Highway 72
- Huntsville-Browns Ferry Road from Burgreen Road to County Line Road
- Mill Road from Balch Road to Hughes Road
- Old Madison Pike from Shelton Road to Slaughter Road
- Wall Triana Highway from Browns Ferry Road to Eastview Drive
- Madison Boulevard from Hughes Road to Zierdt Road
- Mill Road from County Line Road to Balch Road
- Madison Boulevard from County Line Road to Sullivan Street

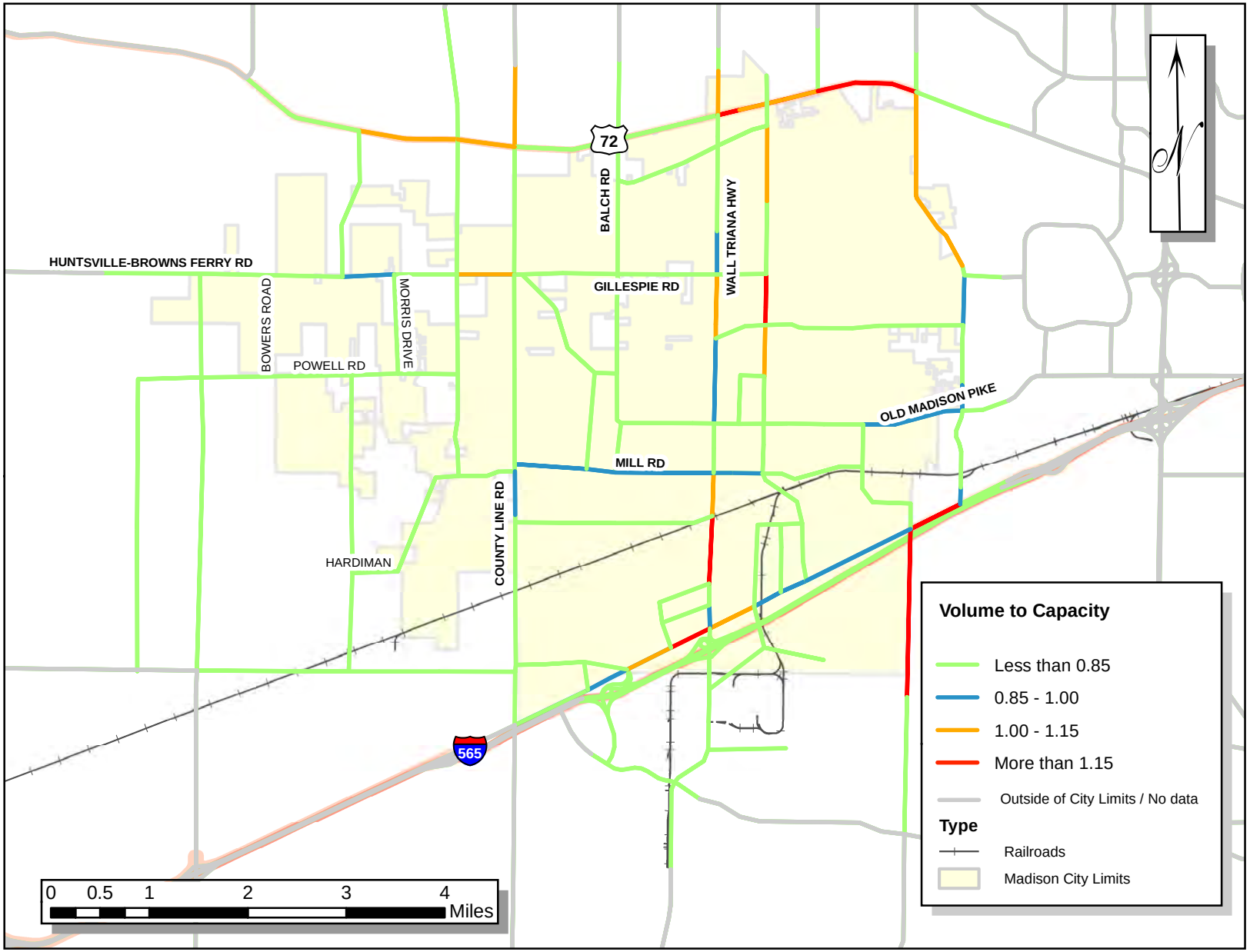
A more detailed assessment of traffic congestion along specific corridors is provided in the corridor assessment presented in Section 5.

4.4.4 Bicycle/Pedestrian and Transit

There is very little connectivity to or between the City's primary bicycle facilities – Bradford Creek Greenway, Mill Creek Greenway, County Line Road side paths, and Hughes Road side path. Similarly, there is also very little connectivity to schools and parks within the city, as identified in the Growth Plan. A review of the locations of existing facilities, parks and schools indicates a need for bicycle accommodations along the following corridors to promote bicycle connectivity:

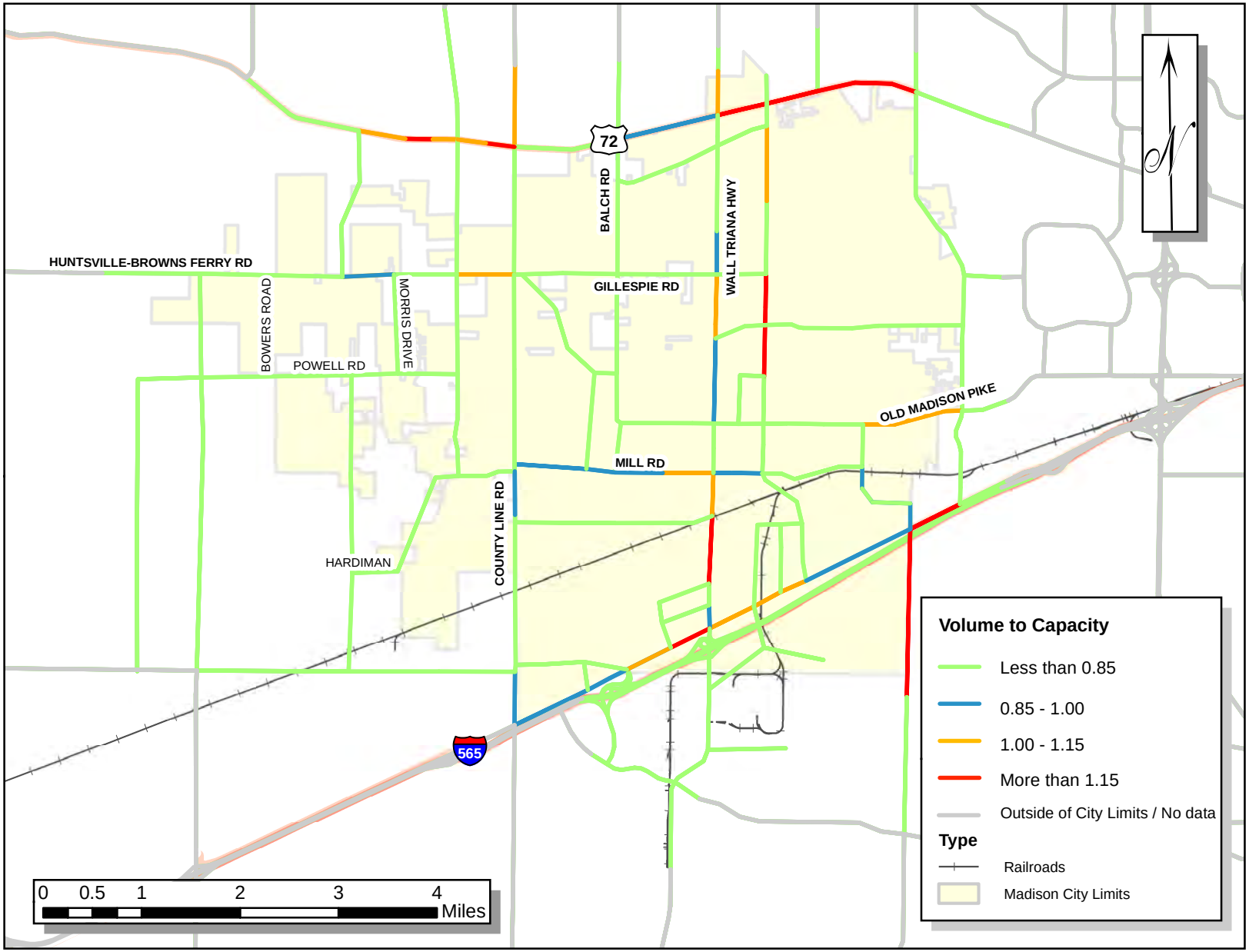
- Mill Road
- Old Madison Pike
- Gillespie Road
- Eastview Drive
- Balch Road
- Highland Drive

Figure 4-8: 2025 Projected Congestion Levels



*Data Source: JRWA, 2017

Figure 4-9: 2040 Projected Congestion Levels



*Data Source: JRWA, 2017

A similar review of sidewalks in relation to trails, side paths, schools and parks, as well as overall city-wide connectivity, indicates pedestrian facilities are needed along the following corridors:

- Gillespie Road
- Balch Road
- Wall Triana Highway
- Mill Road
- Huntsville-Browns Ferry Road
- Browns Ferry Road
- Hardiman Road

These needs are consistent with those identified in the *2025 Parks and Recreation Master Plan.*

An important consideration in promoting connectivity is to increase the number of ADA compliant sidewalks throughout the city. Of the 42 signalized intersections maintained by the City of Madison, 20 have pedestrian accessibility.

Another issue raised by City staff is the lack of bicycle parking facilities. Besides those along trails, there are no bicycle racks or parking bars at shopping centers or commercial uses in the city. As bicycle and trail connections are implemented, the City should look to zoning codes and other standards to provide more bicycle parking and increase the attractiveness of bicycling as a mode of travel.

Madison currently has no generally accessible public transit service. However, given the existing and projected travel conditions along Highway 72, the demand for transit to serve the retail uses along the corridor will likely increase. The demand for transit may also increase in response to projected employment opportunities in the areas of Huntsville adjacent to Madison on the east. Many employers may also become interested in participating in ridesharing and/or carpooling programs.

If transit services are implemented in the future, bus pullouts should be added in the right-of-way of service corridors to avoid causing congestion when buses stop for passenger boarding and alighting.

4.5 SUMMARY OF PROJECTS CONSIDERED FOR THE 2040-TP

Potential improvements were identified through two main methods. First, recent planning documents prepared by the City of Madison and Huntsville Area MPO were reviewed to identify project recommendations applicable to the 2040-TP. Documents that were the source of projects include:

- Huntsville Are MPO 2040 Long Range Transportation Plan (LRTP)
- City of Madison West Side Master Plan
- City of Madison 2025 Transportation Master Plan
- City of Madison Growth Plan
- City of Madison Greenway and Trails Master Plan, 2003
- City of Madison Parks and Recreation Master Plan, 2025

In addition, potential improvements were developed to respond to deficiencies identified during the needs assessment but which were not yet addressed by other recommended projects. Technical analyses included travel demand modeling and corridor operational assessments. Qualitative assessments were also undertaken, particularly for bicycle and pedestrian, transit, and Complete Streets improvements.

Potential projects were categorized based on the type of improvement for consideration:

- **Capacity** – Additional through lanes and/or new roadways
- **Operations** – Intersection signalization, configuration, and/or turn lanes (including center turn lanes)
- **Bicycle/Pedestrian** – Share the Road signage/markings, multi-use trails, sidewalks, and/or pedestrian signals
- **Transit** – New transit service
- **Access Management** – Turn restrictions, medians, shared access, and/or driveway management
- **Complete Streets** – Bicycle/pedestrian enhancements, transit services, and/or landscaping to promote multimodal travel

Based on previous studies and the analysis of existing and projected conditions and needs presented in this section, a total of 116 potential improvements were identified for consideration. A breakdown of the potential improvements by project type includes:

- 26 capacity improvements
    - 16 roadway widenings
    - 9 new roadways and/or extensions
    - 3 undefined projects that noted capacity
- 28 operations improvements
    - 1 new interstate interchange
    - 1 safety project that adds to lane width
    - 4 continuous center turn lanes
    - 13 additional turn lanes at intersections
    - 8 roundabouts
    - 1 intersection realignment
- 40 bicycle/pedestrian improvements
    - 11 bicycle corridors (multi-use trails or bike lanes)
    - 2 trail extensions
    - 10 “Share the Road” corridors
    - 14 sidewalk projects
    - 3 corridors for pedestrian enhancements to complement existing multi-use trails
- 4 transit corridors
- 4 access management corridors/locations
- 11 Complete Streets corridors and one area initiative (West Side)

Appendix B-1 provides additional detail on all improvement projects identified for potential inclusion in the 2040-TP recommendations, along with the project source and related comments.

5.0 CORRIDOR ASSESSMENT AND RECOMMENDATIONS

This section begins with a general discussion of the "Complete Streets" concept and its applicability to the Madison area. Next, quantitative and qualitative factors used to evaluate potential improvements are discussed. Finally, the potential improvements assessed for each corridor are identified, and the projects and implementation prioritization recommended for the 2040-TP are presented.

5.1 APPLICABILITY OF COMPLETE STREETS WITHIN THE CITY OF MADISON

The Complete Streets concept is an emerging movement in transportation planning, design, and engineering. While its definition varies across communities and agencies based on local priorities and contexts, most focus on considering multiple travel modes, accounting for the varying interests of users, and advancing a safer and more accessible transportation system for all users. Thus, while an overarching characterization of Complete Streets within the City of Madison can be provided, its exact application will vary depending on the context presented by any location's immediate surroundings.

The first document to set a policy foundation for Complete Streets within the City of Madison was the West Side Master Plan. This plan identifies three different street "types" for the West Side study area – Parkway, Avenue and Local. The plan also provides design standards by way of recommended and alternative typical sections for each street type. The design standards address the following factors:

- Number of lanes
- Pedestrian facilities
- Bicycle facilities
- Drainage
- Streetscaping
- Furnishings
- Lighting

In addition, specific dimensions were recommended for the design components, which include:

- Right-of-way width
- Median/turn lane width
- Travel lane width
- Tree lawn width
- Side path/sidewalk width
- Side path/shared-use path width
- Parking (on or off-street)
- On-street bicycle facility type and width

The design standards for these items are advisory and would be subject to change based on two primary factors – available right-of-way and area context.

As a follow-up activity to the West Side Master Plan, city staff has developed a set of design guidelines and typical sections in order to promote Complete Streets throughout the City of Madison. Similar to those developed for the West Side Master Plan, these standards include desired ranges for lane widths, right-of-way widths, etc. Given the limited amount of right-of-way available for roadways on

the eastern portion of the City, these guidelines allow for flexibility in Complete Streets implementation. The City of Madison Design Guidelines for Complete Streets is provided in Appendix C.

As part of the 2040-TP corridor assessment activities, locations for implementation of Complete Streets applications were identified. In addition to those recommended in the West Side Master Plan, the context and right-of-way characteristics of the following corridors appear suitable for Complete Streets applications:

- Sullivan Street/Wall Triana Highway – Providing a direct north-south link to downtown, most of this corridor consists of residential development, schools and churches, with commercial nodes at major cross streets. Right-of-way along the roadway is very constrained, particularly close to downtown.
- Mill Road – Primarily surrounded by low density development, there is vacant land on the western portion of the corridor near County Line Road. The roadway already has a trail facility near the Mill Creek Greenway. The eastern portion of the roadway is highly developed, with very constrained right-of-way.
- Gillespie Road from Balch Road to County Line Road – Complete Streets would connect surrounding neighborhoods in this mostly residential corridor. Vacant land on the west side of the corridor could present opportunities.
- Old Madison Pike – This highly developed residential corridor provides access to Dublin Park. Despite constraints between Crestview Drive and Shelton Road, the right-of-way along this corridor appears to present opportunities.
- Slaughter Road – Based primarily on the prospect of incorporating Complete Streets into the future roadway widening, this corridor connects multi-use paths along Zierdt Road with greenways east of the city.
- Browns Ferry Road from Gillespie Road to Balch Road – Surrounded by low density residential development, this corridor could potentially serve as a connection between the Mill Creek and Bradford Creek greenways.
- Palmer Road – Primarily vacant until becoming Front Street near downtown, this corridor is characterized by residential development and a park. While the right-of-way appears to be limited, the abundance of vacant land in the western portion of the corridor presents opportunities for acquisition.
- Balch Road – Surrounded by low density residential, this corridor is directly adjacent to Mill Creek Greenway and near Bradford Creek Greenway. With the exception of the eastern portion where the existing path is located, right-of-way is very constrained along the corridor.

Given that most of these corridors serve residential areas and would connect bicycle facilities and activity centers, the Complete Streets elements should focus on providing bicycle facilities, sidewalks, and appropriate landscaping. Excepting the segments of Sullivan Street and Front Street near downtown, none of these corridors appears appropriate for on-street parking, street furniture or other treatments more suitable for urban environments. Complete Streets design concepts along most of

these corridors would not have a single uniform typical section, instead varying according to different right-of-way characteristics. The recommendation of specific Complete Streets design applications feasible for particular corridors requires more detailed right-of-way assessment along the corridors.

5.2 EVALUATION FACTORS

A range of relative factors, both quantitative and qualitative, as well as initial considerations to differentiate relative levels of importance, were used to assess particular types of improvements. These evaluation factors include:

- **Congestion (Quantitative)** – Existing and projected V/C (volume to capacity) ratios and their ability to serve congested corridors. The analysis included travel demand model outputs for current and future years through 2040. The greater the V/C ratio, the greater the need for congestion relief. A V/C below 0.85 is desirable.
- **Intersection Operations (Quantitative/Qualitative)** – Ability to improve operations at intersections or along corridor segments based on existing traffic counts and projected growth from the travel demand model. This measure also takes into account field survey observations.
- **Annual Average Daily Traffic (AADT) (Quantitative)** – Ability to benefit high volume corridors, based on existing traffic counts and projected volumes derived from the travel demand model.
- **Bicycle Suitability (Qualitative)** – Ability to serve land uses and community activities supportive of travel by bicycle. Examples of key destinations include residential areas, trails, parks, community gathering spaces, commercial activity, employment centers, and schools.
- **Pedestrian Suitability (Qualitative)** – Ability to serve land uses and community activities supportive of travel on foot. Examples of key destinations include residential areas, trails, parks, community gathering spaces, commercial activity, employment centers, and schools. The primary difference between pedestrian and bicycle suitability is that sidewalks need to be closer to the land uses they are intended to serve.
- **Right-of-way Constraints (Quantitative/Qualitative)** – Available right-of-way and/or the constrained nature of the project location. Current right-of-way and parcel boundary information from Google Maps was used and the placement of surrounding development was considered. Projects have a greater potential for implementation when more right-of-way is available and/or the area is less constrained.
- **Land Uses (Qualitative)** – Ability to serve higher density uses and/or projected high growth areas.
- **Safety (Quantitative)** – Ability to improve safety along a corridor. Recorded crash rates were obtained from the CARE data for a given roadway; however, specific locations of crashes cannot be provided due to privacy issues of those involved.
- **Connectivity (Qualitative)** – Ability to improve the overall connectivity of the multimodal transportation system by filling gaps in the network.
- **Costs (Quantitative/Qualitative)** – Cost in relation to the overall need along a given corridor. Costs were developed by applying planning-level unit costs, which is discussed in Section 6.

Table 5-1 identifies the primary and supporting factors considered for each type of improvement when evaluating potential improvements. It should be noted that these evaluation factors may also change the overall definition of a project.

Table 5-1: Evaluation Factors

Evaluation Factors	Improvement Types					
	Capacity	Operations	Bicycle/ Pedestrian	Transit	Access Management	Complete Streets
Congestion	X			X	O	
Intersection Operations		X			O	
Traffic Volumes	O	O	O			O
Bicycle Suitability		O	X			X
Pedestrian Suitability		O	X			X
Right-of-Way Constraints	O	O	O			X
Land Uses	O	O	O	O	O	X
Safety		O	O		X	O
Connectivity	O		X	O		O
Costs	X	X	O	O	O	O

X – Primary factor(s) for identifying potential need
O – Other considerations for prioritizing potential improvement types

Potential improvements were evaluated to gauge the degree to which they responded to the identified need. Key factors considered for each type of improvement are listed below.

- **Capacity** – The primary factor for capacity projects is congestion, as indicated by the volume to capacity (V/C) ratio. V/C is derived from the traffic counts taken in 2017 and travel demand modeling projections for 2025 and 2040. Typically, as V/C ratio exceeding 1.0 reflects a need for additional capacity. Other factors taken into consideration are the amount of traffic on the roadway and right-of-way constraints.
- **Operations** – The primary indicators of operational deficiencies were the intersection assessments based on 2017 traffic counts and 2025 projected volumes from the travel demand model. Existing and projected traffic volumes at the intersection are considered against turn movement counts to identify intersection deficiencies. The potential need for a center turn lane was primarily identified through existing and projected congestion levels. Other factors considered the number of trips served at the intersection, congestion levels along the roadway corridors, right-of-way constraints, and safety.
- **Bicycle Facilities** – The primary indicators for bicycle facilities – which could include on-street bicycle lanes or off-street multi-use paths – are bicycle suitability and connectivity. Considerations for bicycle facilities include roadway traffic volumes as well as the ability to connect to destinations supportive of travel by bicycle (such as residential areas, trails and parks, schools, retail and employment centers, and community facilities). Other factors include

right-of-way constraints and overall travel demand along a specific corridor. The need for new or extensions to off-road paths/trails (such as the Bradford Creek and Mill Creek greenways) is focused on connectivity to existing facilities and recreational areas.

- **Pedestrian Facilities** – Pedestrian facilities primarily include sidewalks, crosswalks and pedestrian signalization. The primary indicator for sidewalks is pedestrian suitability and connectivity to other sidewalks and/or bicycle facilities. Pedestrian suitability considers the ability to access key destinations safely by walking. A primary difference between pedestrian and bicycle suitability is that sidewalks need to be closer to the destinations they are intended to serve.
- **Transit Routes/Corridors** – Without having existing services to gauge transit propensity and/or ridership characteristics, the primary indicators for any potential new transit services are existing and projected traffic volumes and roadway congestion levels. Other indicators for potential transit service are the presence of higher density residential and employment concentrations and connections to activity centers, retail uses, and/or community facilities.
- **Access Management** – The two primary indicators for access management strategies are safety and roadway geometrics (such as proximity of adjacent curb cuts, alignment of medians and turn lanes with respect to curb cuts, etc.). Other factors considered are congestion, intersection operations, and supportive land uses.
- **Complete Streets** – Determining the need for Complete Streets applications is based upon multiple factors, including the suitability of adding bicycle and/or pedestrian facilities within the right-of-way, the availability of right-of-way, roadway operational characteristics, and supportive land uses. Other considerations include traffic volumes, safety and connectivity to other bicycle and pedestrian facilities.

5.3 CORRIDOR ASSESSMENTS

The major corridors within the Madison study area were assessed with respect to:

- Corridor travel demand and operations
- Alternative mode needs (bicycle/pedestrian facilities and transit services)
- Access management opportunities/needs
- Potential Complete Streets applications

Technical analyses undertaken as a part of the 2040-TP effort, explained previously in Section 4, included travel demand modeling and corridor/intersection operational assessments. Qualitative assessments were also undertaken, particularly for bicycle and pedestrian, transit, and Complete Streets improvements. With regard to travel demand and corridor operations, the analysis and associated data sources included:

- Existing Link Volume Analysis – 2017 traffic counts and ALDOT highway capacity assumptions
- Projected Link Volume Analysis – 2025 and 2040 travel demand modeling results
- Intersection Analysis – 2017 traffic counts, growth predicted in the 2025 model run, peak hour traffic conditions, and turn movement demand

Potential improvements were developed to respond to deficiencies identified during the needs assessment but which were not yet addressed by other recommended projects. To identify existing project recommendations that could be applicable to the 2040-TP, recent planning documents prepared by the City of Madison, Huntsville Area MPO, and City of Huntsville were reviewed. Documents that were the source of such projects included:

- Huntsville Are MPO 2040 Long Range Transportation Plan (LRTP)
- City of Madison West Side Master Plan
- City of Madison 2025 Transportation Master Plan
- City of Madison Growth Plan
- City of Madison Greenway and Trails Master Plan, 2003
- City of Madison Parks and Recreation Master Plan, 2025

The key findings and improvement recommendations resulting from the corridor assessments are presented in the following pages. Appendix B-1 includes a complete listing of the potential improvements considered for each corridor, along with the evaluation results for each improvement.

The presentation of assessment findings that follows groups the corridors as east-west or north-south. The east-west corridors are ordered from north to south, while the north-south corridors are ordered from east to west. Thus, the corridor organization is as follows:

East-West Corridors

- Highway 72
- Gooch Lane
- Huntsville-Browns Ferry Road
- Gillespie Road
- Eastview Drive
- Browns Ferry Road
- Old Madison Pike
- Mill Road/ Portal Lane
- Palmer Road
- Hardiman Road
- Madison Boulevard

North-South Corridors

- Slaughter Road
- Zierdt Road
- Shelton Road
- Hughes Road
- Sullivan Street/Wall Triana Highway
- Balch Road
- County Line Road
- Burgreen Road

5.4 EAST-WEST CORRIDORS

5.4.1 Highway 72

FINDINGS

Existing Link Volume Analysis

Highway 72 carries the highest volumes of any east-west roadway in the city. Current traffic volumes on this four-lane roadway range from 23,000-28,000 west of Hughes Road, but increase significantly to over 42,000 east of Hughes Road. Current V/C ratios along the roadway reflect a great deal of

congestion east of Hughes Road, jumping from approximately 0.75 west of Hughes Road to 1.25 east of Hughes Road, well beyond the LOS F threshold. Based on these congestion levels, additional capacity along the corridor is needed. The segment of Highway 72 east of County Line Road is scheduled for widening to a six-lane facility in 2019.

Projected Link Volume Analysis

Volumes on Highway 72 are projected to increase significantly by 2025. Increases of roughly 50 percent west of Hughes Road will result in volumes of 35,000-40,000 trips per day, while volumes east of Hughes Road will reach 57,000 trips per day. Much of this increase can be attributed to the additional capacity available after the roadway widening. However, even with the additional capacity, the segment east of Hughes Road is projected to operate at V/C ratios beyond the threshold for LOS F. The volumes and congestion levels projected by 2040 indicate very little increase from 2025 levels.

Intersection Analysis

Due to the future widening project, only the intersection of Highway 72 at Wall Triana Highway was assessed for potential short-term improvements. Based on this analysis, a left turn lane and right turn lane eastbound at Wall Triana Highway appear needed.

Alternative Mode Needs

The level of travel demand combined with retail and employment concentrations indicate a need for sidewalks, crosswalks and pedestrian signalization throughout the corridor. Pedestrian amenities could also promote increased use of the multi-use trails along Hughes Road and County Line Road. Furthermore, the travel demand, projected future congestion levels, and concentration of retail and employment uses along Highway 72 indicate the corridor's apparent suitability for transit services.

Access Management Opportunities/Needs

Opportunities may exist for limiting/consolidating curb cuts from County Line Road east to Huntsville during the six-lane widening project. West of County Line Road, all of the adjacent property is either unincorporated or within the City of Huntsville. Given the high traffic volumes, it is assumed that turn restrictions and medians will be placed along the corridor as appropriate.

Complete Streets Application/Potential

High amounts of through-traffic limit the potential for on-street applications. However, the roadway widening design should consider bicycle, pedestrian and transit needs.

RECOMMENDED IMPROVEMENTS/STRATEGIES

- Widen Highway 72 from 4 to 6 lanes from County Road Line to Providence Main Boulevard (Near Term; in ALDOT work program)
- Install additional eastbound left turn lane on Highway 72 at Wall Triana Highway (Near Term)
- Install eastbound right turn lane on Highway 72 at Wall Triana Highway (Near Term)
- Install sidewalks and pedestrian signals as part of the widening project (Near Term)
- Coordinate with ALDOT and Huntsville to ensure proper access management along the corridor as part of the widening project (Near Term)
- Coordinate with Huntsville MPO and other agencies for potential transit service (Longer Term)

5.4.2 Gooch Lane

FINDINGS

Existing Link Volume Analysis
Although a two-lane minor collector, Gooch Lane serves as a parallel reliever to Highway 72 between Balch Road and Hughes Road. Traffic volumes currently range from 3,000 trips per day west of Wall Triana Highway to 5,000 trips east of Wall Triana Highway to Hughes Road. The 2017 V/C ratios reflect free flow conditions, so no capacity improvements appear needed. However, the volumes and congestion on Wall Triana Highway and Hughes Road suggest operational improvements may be needed for peak hour conditions.

Projected Link Volume Analysis
By 2025, volumes are projected to increase to approximately 4,400 trips per day west of Wall Triana Highway and 7,400 east of Wall Triana Highway. The V/C ratios along the corridor do not indicate congested conditions in 2025. By 2040, the V/C ratio is projected to increase to only 0.6 and, therefore, no capacity improvements appear needed through 2040.

Intersection Analysis
No specific intersection analysis was performed along the corridor. A traffic signal is being installed at Gooch Lane and Hughes Road.

Alternative Mode Needs
The land use characteristics indicate little pedestrian demand is expected compared to other corridors. However, gaps along the existing sidewalks should be filled in to promote pedestrian activity and enhance connectivity to the Hughes Road multi-use trail.

Access Management Opportunities/Needs
Access management is not applicable to this corridor as the many driveways access private residences.

Complete Streets Application/Potential
Right-of-way limitations along the corridor limit the potential for Complete Streets.

RECOMMENDED IMPROVEMENTS/STRATEGIES

- Fill in sidewalk gaps to promote connectivity to Hughes Road multi-use trail through regular maintenance (Longer Term)

5.4.3 Huntsville-Browns Ferry Road

FINDINGS

Existing Link Volume Analysis
Traffic volumes along this two-lane roadway are approximately 7,500 trips per day. The resulting V/C ratio of approximately 0.5 indicates free flow conditions and no need for capacity improvements.

Projected Link Volume Analysis
Located within one of the fastest growing areas of Madison, volumes along Huntsville-Browns Ferry Road are projected to increase significantly. The approximately 17,000 trips per day by 2025

represents an increase of roughly 120 percent. The projected 2025 V/C ratio of 1.00 is also beyond the LOS E threshold, indicating the need for peak hour operational improvements.

Intersection Analysis
The intersection of Huntsville-Browns Ferry Road/Gillespie Road at County Line Road was assessed for potential near term improvements. The analysis supports the immediate need for a westbound right turn lane from Gillespie Road to County Line Road, with northbound and eastbound right turn lanes needed by 2025.

Alternative Mode Needs
The operational improvements needed by 2025 present an opportunity to implement bike lanes and complete sidewalk connections to surrounding developments and the County Line Road multi-use trail.

Access Management Opportunities/Needs
Most of the area west of Burgreen Road within the City limits is undeveloped, so opportunities exist to work with developers to minimize and align curb cuts in order to preserve corridor mobility. As congestion continues to increase, restricting turn movements to the retail/commercial uses at County Line Road may be necessary.

Complete Streets Application/Potential
Complete Streets applications are recommended for consideration along this corridor due to the potential for connectivity to the County Line Road multi-use trail, undeveloped land along the corridor, and projected future congestion.

RECOMMENDED IMPROVEMENTS/STRATEGIES

- Install sidewalks along both sides of roadway to connect to new development (Near Term)
- Add 'Share the Road' signage and/or pavement markings along roadway (Near Term)
- Install bike lane for connectivity to County Line Road multi-use trail (Longer Term)
- Widen to four lanes from Bowers Road to County Line Road (Longer Term)
- Implement Complete Streets applications (Longer Term)

5.4.4 Gillespie Road

FINDINGS

Existing Link Volume Analysis
Traffic volumes along this two-lane roadway are approximately 7,500 trips per day. The resulting V/C ratio of approximately 0.5 indicates free flow conditions and no need for capacity improvements.

Projected Link Volume Analysis
Located in a high growth area, volumes along Gillespie Road are projected to increase to approximately 10,700 trips per day by 2025, an increase of over 40 percent. Even with this increase, the projected V/C ratio of 0.65 is well below the need for capacity improvements.

Intersection Analysis
The following intersections were assessed for potential near term improvements:

- Gillespie Road at County Line Road
- Gillespie Road at Balch Road

- Gillespie Road at Wall Triana Highway

Based on the intersection analysis, the following operational improvements appear needed:

- Gillespie Road at County Line Road – The analysis supports the need for eastbound right turn lanes needed by 2025.
- Gillespie Road at Balch Road – Installation of single-lane roundabout is warranted based on volumes and turn movements. This project is scheduled for completion in 2018.
- Gillespie Road at Wall Triana Highway – Installation of single-lane roundabout is warranted based on volumes and turn movements at current peak hour conditions.

Alternative Mode Needs

Surrounding land uses and potential connections to trail facilities suggest that Gillespie Road could be a critical link in the bicycle/pedestrian network. A multi-use path or bike lane from Balch Road to County Line Road was previously proposed. In addition, ensuring sidewalks are available throughout the segment would be a particularly important pedestrian connection under the bike lane alternative.

Access Management Opportunities/Needs

Access management techniques are not as applicable due to the fact the corridor is fully developed and/or environmentally sensitive (Bradford Creek).

Complete Streets Application/Potential

Given connectivity to the County Line Road multi-use trail and Bradford Creek Greenway, Complete Streets applications are recommended for consideration from County Line Road to Balch Road.

RECOMMENDED IMPROVEMENTS/STRATEGIES

- Add 'Share the Road' signage and/or pavement markings along roadway (Near Term)
- Install eastbound right turn lanes at County Line Road intersection (Longer Term)
- Install multi-use path or bike lanes and sidewalk from Balch Road to County Line Road (Longer Term)
- Implement Complete Streets applications from Balch Road to County Line Road (Longer Term)

5.4.5 Eastview Drive

FINDINGS

Existing Link Volume Analysis

Roadway volumes along Eastview Drive are much greater east of Hughes Road than to the west. Traffic volumes west of Hughes Road are roughly 3,300 per day and increase to over 6,400 east of Hughes, resulting in a V/C ratio of 0.4 between Hughes Road and Slaughter Road. No capacity improvements are currently needed.

Projected Link Volume Analysis

Volumes along Eastview Drive from Hughes Road to Slaughter Road are projected to increase to approximately 9,800 trips per day by 2025, representing an increase of over 40 percent. The projected V/C ratios along the roadway do not indicate a future need for capacity improvements through 2040.

Intersection Analysis

The following intersections were assessed for potential near term improvements:

- Eastview Drive at Wall Triana Highway
- Eastview Drive at Hughes Road

Recommended improvements for these locations are provided in the corridor assessments of Wall Triana Highway and Hughes Road.

Alternative Mode Needs

Eastview Drive connects to Bob Jones High School and the Rainbow Mountain nature trails. As such, it has been identified as a potential bicycle and pedestrian corridor. The existing sidewalk to Highland Drive provides an important connection to surrounding neighborhoods.

Access Management Opportunities/Needs

Access management is not applicable due to the many private residence driveways along the corridor.

Complete Streets Application/Potential

Right-of-way limitations along the corridor limit the potential for Complete Streets.

RECOMMENDED IMPROVEMENTS/STRATEGIES

- Install sidewalks from Highland Drive to Slaughter Road (Longer Term)
- Add 'Share the Road' signage and/or pavement markings along roadway (Near term)

5.4.6 Browns Ferry Road

FINDINGS

Existing Link Volume Analysis

Roadway volumes along Browns Ferry Road from Gillespie Road to Balch Road are relatively low. Traffic volumes west of Hughes Road are roughly 3,000 per day, which results in very little congestion along the roadway. Between Hughes Road and Wall Triana Highway, traffic volumes double to roughly 6,200 trips per day. The 0.3 V/C ratio is still under the threshold for capacity improvements.

Projected Link Volume Analysis

Volumes along the segments of Browns Ferry Road from Gillespie Road to Wall Triana Highway are expected to increase to roughly 7,200-7,500 trips per day, with a V/C ranging from 0.4 to 0.5, by 2025. In 2040, V/C ratios are projected to increase to approximately 0.6, which does not indicate a future need for capacity improvements through 2040. East of Wall Triana Highway, roadway volumes are projected to increase to approximately 11,800 trips per day by 2025 and 11,900 by 2040. This increase results in a projected V/C ratio of approximately 0.6 for 2025 and 2040; therefore, no capacity improvements appear to be needed through 2040.

Intersection Analysis

The intersections at Wall Triana Highway and Hughes Road were assessed for potential near term improvements. Recommended improvements for these location is provided in the corridor assessments of those corridors.

Alternative Mode Needs

The segment of Browns Ferry Road from Balch Road to Park Meadow should be considered for a sidewalk to close the gap along Wall Triana Highway and connect nearby commercial uses. In addition, the segment between Balch Road and Gillespie Road is a potential bicycle connection to Mill Creek Greenway, Bradford Creek Greenway, and the County Line Road multi-use trail.

Access Management Opportunities/Needs

The amount of undeveloped land between Gillespie Road and Balch Road and the low density development east of Balch Road present opportunities for preserving corridor mobility by working with developers to minimize and align curb cuts. As congestion continues to increase, turn movement restrictions may be necessary at the retail/commercial uses between Wall Triana Highway and Hughes Road.

Complete Streets Application/Potential

The corridor's potential for bicycle connectivity presents opportunities for Complete Street applications. The absence of future capacity improvements would necessitate installation of Complete Streets applications as a part of maintenance or operational improvements.

RECOMMENDED IMPROVEMENTS/STRATEGIES

- Install sidewalks from Balch Road to Park Meadow (Longer Term)
- Add 'Share the Road' signage and/or pavement markings from Balch Road to Gillespie Road (Near Term)
- Implement Complete Streets applications from Balch Road and Gillespie Road (Longer Term)

5.4.7 Old Madison Pike

FINDINGS

Existing Link Volume Analysis

Old Madison Pike provides the primary east-west access to the city's inner core as well as a direct connection eastward to Huntsville. Traffic volumes along the three-lane roadway west of Shelton Road are approximately 10,700 trips per day, with a V/C ratio slightly over 0.5, which does not indicate a need for future capacity improvements. Between Shelton Road and Slaughter Road, the number of trips increases to 15,400 trips per day, with a V/C ratio of approximately 0.75, which also does not indicate a current need for capacity improvements.

Projected Link Volume Analysis

Old Madison Pike is projected to experience a 30 percent increase in volumes by 2025, ranging from 13,700 to 20,800 trips and V/C ratios from 0.7 to 1.00, or LOS E. This level of traffic demand indicates the potential need for peak hour operational improvements by 2025. The 2040 volumes are projected to increase by less than 1,000 trips per day from 2025 volumes.

Intersection Analysis
The intersection of Old Madison Pike and Hughes Road was assessed for potential near term improvements. Recommended improvements for this location is provided in the corridor assessment of Hughes Road.

Alternative Mode Needs
The Old Madison Pike corridor's connectivity to the multi-use trail along Hughes Road and trail facilities in Huntsville, as well as surrounding retail, park and school land uses, make it a potentially critical link in Madison's bicycle and pedestrian network. The multi-use path or bike lane from Hughes Road to east of Slaughter Road and proposed in previous efforts is supported by the current analysis findings.

Access Management Opportunities/Needs
Corridor mobility could be preserved through coordination with future developers to minimize and align curb cuts between Shelton Road and Highland Drive. The remainder of the corridor is already built out, with the intersection at Hughes Road experiencing congested conditions. Turn movement restrictions to the commercial properties at this intersection may be needed to preserve mobility and increase intersection safety.

Complete Streets Application/Potential
Complete Streets applications are recommended for consideration from Hughes Road to Slaughter Road given the connections to the Hughes Road multi-use path, Huntsville trail facilities, and surrounding retail, park, and school land uses.

RECOMMENDED IMPROVEMENTS/STRATEGIES

- Widen Old Madison Pike from 3 to 4 lanes from Hughes Road to Slaughter Road (with continuous center turn lane) (Longer Term)
- Install multi-use path or bike lanes from Hughes Road to east of Slaughter Road (Longer Term)
- Add 'Share the Road' signage and/or pavement markings along roadway (Near Term)
- Implement Complete Streets applications when addressing capacity needs from Hughes Road to Slaughter Road (Longer Term)

5.4.8 Mill Road/Portal Lane

FINDINGS

Existing Link Volume Analysis
Traffic volumes along two-lane Mill Road between County Line Road and Hughes Road range from 8,600 to 9,500 trips per day. The resulting V/C ratio of between 0.5 and 0.6 does not indicate the need for capacity improvements. Portal Lane has a traffic count of approximately 2,300 east of Hughes Road, reflecting a V/C ratio of 0.2 and no congestion of particular concern.

Projected Link Volume Analysis
By 2025, roadway volumes along Mill Road are projected to increase by roughly 60 percent and range from 14,310 and 15,000 between County Line Road and Hughes Road. The resulting V/C ratios of 0.9 to 1.0 represent congested conditions. By 2040, the number of trips along Mill Road range from 15,300 to 16,300 and continue to operate at congested conditions. These characteristics indicate that a center

turn lane or other peak hour operational improvements will be needed by 2025. Roadway volumes along Portal Road are projected to increase significantly by 2025 to over 10,300 trips per day. By 2040, the projected V/C ratio is slightly over 0.6, which does not indicate the need for capacity improvements.

Intersection Analysis
The following intersections were assessed for potential near term improvements:

- Mill Road at County Line Road
- Mill Road at Sullivan Street

Based on the intersection analysis, an eastbound right turn lane from Mill Road onto Sullivan Street is recommended. Other recommended improvements are included in the corridor assessments for County Line Road and Sullivan Street/Wall Triana Highway.

Alternative Mode Needs
The Mill Road corridor is a potential connection between Mill Creek, Bradford Creek and the County Line Road multi-use trail. Mill Creek Elementary is also nearby. Mill Road offers an ideal bicycle corridor given its potential connections to trail facilities and surrounding retail, park and school land uses. As such, a multi-use path or bike lanes should be considered along the corridor.

Access Management Opportunities/Needs
Opportunities exist to work with future developers to minimize and align curb cuts along the undeveloped segments of the corridor to preserve corridor mobility. The remainder of the corridor is already built out.

Complete Streets Application/Potential
Complete Streets applications are recommended for consideration from County Line Road to Hughes Road due to proximity to trail facilities, schools and activity centers.

RECOMMENDED IMPROVEMENTS/STRATEGIES

- Widen Mill Road from Hughes Road to County Line Road to four lanes (with continuous center turn lane) (Longer Term)
- Install center turn lane along Mill Road from Hughes to County Line Road (Longer Term)
- Install eastbound right turn lane from Mill Road to Sullivan Street (Near Term)
- Install multi-use path or bike lanes from Hughes Road to County Line Road (Longer Term)
- Install sidewalk between County Line Road and Bradford Creek Greenway (Near Term)
- Add ‘Share the Road’ signage and/or pavement markings along roadway (Near Term)
- Implement Complete Streets applications when addressing capacity needs from County Line Road to Hughes Road (Longer Term)

5.4.9 Palmer Road

FINDINGS

Existing Link Volume Analysis
With roadway volumes of approximately 3,900 trips per day, two-lane Palmer Road operates at a V/C ratio of 0.3, well under congestion conditions. No immediate roadway improvements appear needed in the corridor.

Projected Link Volume Analysis
Although roadway volumes are projected to more than double to over 8,000 trips per day by 2025, which would represent a V/C ratio of approximately 0.5, no capacity improvements appear needed through 2040.

Intersection Analysis
An assessment of the Palmer Road at Sullivan Street intersection did not indicate improvements are needed. However, the assessment did verify the need for additional capacity along Sullivan Street.

Alternative Mode Needs
The Palmer Road corridor rates favorably for bicycle facilities given its potential connectivity to Palmer Park, Bradford Creek multi-use trail, and the County Line Road multi-use trail. The roadway also provides a connection from these amenities to Downtown.

Access Management Opportunities/Needs
Given the amount of undeveloped land throughout the corridor, opportunities exist to work with developers to minimize and align curb cuts, preserving mobility in the corridor.

Complete Streets Application/Potential
Connections to trail facilities, Palmer Park, and downtown via Palmer Road suggest that Complete Streets applications should be considered along the corridor from County Line Road to Sullivan Street. As no capacity improvements are recommended along the corridor, Complete Streets applications would come with maintenance or operational improvements.

RECOMMENDED IMPROVEMENTS/STRATEGIES

- Install multi-use path or bike lanes from County Line Road to Sullivan Street (Near Term)
- Add 'Share the Road' signage and/or pavement markings along roadway (Near Term)
- Implement Complete Streets applications when addressing maintenance and operations needs from County Line Road to Sullivan Street (Longer Term)

5.4.10 Hardiman Road

FINDINGS

Existing Link Volume Analysis
As a two-lane roadway with traffic volumes of approximately 4,800 trips per day and a V/C ratio of 0.3, Hardiman Road is operating at free flow conditions and no immediate roadway improvements appear needed.

Projected Link Volume Analysis

Roadway volumes are projected to increase to approximately 6,900 trips per day in 2025 and 7,800 trips per day by 2040. With a projected V/C ratio of approximately 0.5, no capacity improvements appear to be needed. It should be noted that a median and center turn pockets was recommended along the corridor as part of the West Side Master Plan. While not warranted by the projected volume and V/C ratio along the roadway, the improvement would further the overall vision of the West Side Master Plan and enhance the overall urban context of the area.

Intersection Analysis

No intersection analysis was performed along this corridor. It should be noted that the West Side Master Plan recommends a roundabout at the intersection of Hardiman Road and Burgreen Road. While projected travel demand does not indicate a need for the improvement to improve operational characteristics, the improvement will support the overall vision for the West Side Master Plan from an urban context perspective.

Alternative Mode Needs

It should be noted that the West Side Master Plan recommended the installation of a multi-use trail along the roadway to promote its overall vision. Given the relatively undeveloped nature of the corridor, coordination with developers should be considered as a strategy to help develop the multi-use trail. Sidewalks as well as 'Share the Road' signage and markings along the corridor, particularly between Burgreen Road and County Line Road, may appropriate interim steps as development continues to occur to promote bicycle and pedestrian travel in the area.

Access Management Opportunities/Needs

Opportunities exist to work with future land developers to minimize and align curb cuts, particularly west of Burgreen Road, in order to preserve corridor mobility.

Complete Streets Application/Potential

As part of the recommendations of the West Side Master Plan, the Hardiman Road Corridor is recommended for Complete Streets. The undeveloped nature of the corridor presents an opportunity for Complete Streets applications from a right-of-way perspective as well as that to work with developers to assist in the implementation of Complete Streets treatments.

RECOMMENDED IMPROVEMENTS/STRATEGIES

- Install center turn pockets and median from Burgreen Road to Segers Road (Longer Term)
- Install roundabout at Hardiman Road and Burgreen Road (Longer Term)
- Install sidewalk between Burgreen Road and County Line Road (Longer Term)
- Install sidewalk between Segers Road and Burgreen Road in concert with developers (Longer Term)
- Add 'Share the Road' signage and/or pavement markings along roadway (Near Term)
- Implement Complete Streets applications (Longer Term)

5.4.11 Madison Boulevard

FINDINGS

Existing Link Volume Analysis

Madison Boulevard carries the second greatest volumes of the city's east-west roadways. Traffic volumes currently range from approximately 18,200 east of County Line Road to 29,400 east of Zierdt Road. Currently a four-lane roadway, the V/C ratios range from 0.6 to 0.9, indicating the potential need for peak hour operational improvements.

Projected Link Volume Analysis

By 2025, volumes are projected to increase significantly along Madison Boulevard, ranging from approximately 27,200 to 39,300 trips. This would result in V/C ratios ranging from 0.9 to 1.25, reflecting worsening congestion by 2025. Very little increase in roadway volumes and congestion levels occurs between 2025 and 2040; however, capacity improvements appear warranted by 2025.

Intersection Analysis

The following intersections were assessed for potential near term improvements:

- Madison Boulevard at Zierdt Road
- Madison Boulevard at Wall Triana Highway
- Madison Boulevard at County Line Road

Based on the intersection analysis, the following operational improvements appear needed:

- Additional westbound left turn lane from Madison Boulevard to Zierdt Road (currently included within the design of the ongoing widening project)
- No operational improvements are recommended for the Madison Boulevard at Wall Triana Highway intersection because it needs additional through-lanes
- Additional westbound right turn lane from Madison Boulevard to County Line Road

Of the two operations improvements at County Line Road, the westbound right turn is a much easier improvement than an additional eastbound turn lane since it does not require widening of County Line north of intersection.

Alternative Mode Needs

Given its auto-oriented nature, sidewalks are not recommended along the corridor at this time. On the other hand, the level of travel demand, concentration of retail and employment, and projected future congestion appear suitable for transit services. Should transit services be implemented or substantial redevelopment activities occur along the corridor, the need for sidewalks will need to be revisited.

Access Management Opportunities/Needs

The number of curb cuts and median breaks along the corridor warrant a more detailed assessment of access management needs and potential solutions for Madison Boulevard. Based on field observations, several opportunities exist to consolidate driveways, particularly east of Sullivan Street. Furthermore, much of the development along the corridor is older commercial and industrial uses that present potential redevelopment opportunities. The City should also promote driveway consolidation and realignment along the corridor.

Complete Streets Application/Potential

Complete Streets may not be appropriate for this corridor when compared to others throughout the city given its higher traffic volumes and through traffic. Although current development patterns are not supportive of bicycle and pedestrian travel, the potential for redevelopment may change that characteristic over time.

RECOMMENDED IMPROVEMENTS/STRATEGIES

- Widen from County Line Road to Zierdt Road to six lanes (with median and turn lanes) (Near Term)
- Install additional westbound right turn lane from Madison Boulevard to County Line Road (Near Term)
- Coordinate with Huntsville MPO and other agencies for potential transit service (Longer Term)
- Investigate potential access management strategies along the corridor, with or without capacity improvements (Longer Term)

5.5 NORTH-SOUTH CORRIDORS

5.5.1 Slaughter Road

FINDINGS

Existing Link Volume Analysis

Between Highway 72 and Old Madison Pike, traffic volumes along the two-lane roadway range from 12,000 to 15,300 trips per day. Resulting V/C ratios between 0.7 and 0.9 represent moderate congestion levels. South of Old Madison Pike to Madison Boulevard, traffic decreases to just over 6,000 trips per day and does not currently operate under congested conditions. The roadway is planned for widening after the year 2025.

Projected Link Volume Analysis

By 2025, volumes between Highway 72 and Old Madison Pike are projected to increase significantly, ranging from 15,100 to 19,400 trips per day. This still represents V/C ratios between 0.8 and 1.1 and high levels of congestion. Volumes south of Old Madison Pike are projected to increase to nearly 9,900 trips per day and operate at a V/C ratio at 0.6. With the widening to four-lanes, volumes on the segment of Slaughter Road north of Old Madison Pike are projected to increase significantly by 2040, ranging from 22,000 to 25,000 trips per day. V/C ratios from 0.7 to 0.8 indicate that the planned widening should provide needed capacity through 2040.

Intersection Analysis

No intersection analysis was performed along the corridor.

Alternative Mode Needs

Given the constrained nature of the roadway and its pending widening, no bicycle and pedestrian facilities are recommended along the corridor until the roadway is widened.

Access Management Opportunities/Needs
Most of the corridor is already developed, but some vacant properties still exist between Farrow Road and Madison Boulevard. Curb cuts at these locations should be minimized and aligned to preserve corridor mobility.

Complete Streets Application/Potential
Right-of-way constraints currently limit the potential for Complete Streets along the corridor, but potential applications should be revisited at the time of the planned widening.

RECOMMENDED IMPROVEMENTS/STRATEGIES

- Widen Slaughter Road from 2 to 4 lanes from Highway 72 to Old Madison Pike (Near Term; in ALDOT work program)
- Widen Slaughter Road from 2 to 4 lanes from Old Madison Pike to Madison Boulevard (Longer Term; in ALDOT work program)
- Include sidewalks with the planned roadway widenings (Longer Term)
- Coordinate with Huntsville MPO and ALDOT to explore potential Complete Streets applications with planned widenings (Longer Term)

5.5.2 Zierdt Road

FINDINGS

Existing Link Volume Analysis
Traffic volumes along the two-lane Zierdt Road are approximately 16,200 trips per day, resulting in severe congestion. The widening of Zierdt Road to a four-lane roadway is nearly complete.

Projected Link Volume Analysis
The amount of growth projected in the Town Madison and Redstone Arsenal area results in projected roadway volumes more than doubling, to approximately 33,500 trips per day in 2025. Even as a four-lane facility, the resulting V/C ratio of over 1.2 represents heavily congested conditions. Although very little increase in roadway volumes and congestion levels is projected from 2025 to 2040, the roadway will likely need additional capacity by 2025 due to the high level of growth projected along the corridor.

Intersection Analysis
The intersection of Madison Boulevard and Zierdt Road was assessed for potential near term improvements. Based on the analysis, it appears an additional westbound left turn lane from Madison Boulevard onto Zierdt Road will be needed by 2025 given projected peak hour conditions. The Zierdt Road widening project design already includes an additional left turn lane from Madison Boulevard.

Alternative Mode Needs
The City of Huntsville is currently constructing a multi-use path with the widening project from Martin Road to the south of the city.

Access Management Opportunities/Needs
Should the redevelopment of Redstone Arsenal take place along the east side of Zierdt Road, there would be a definite need to incorporate access management strategies during redevelopment activity.

However, this area is within the City of Huntsville, so coordination between the two cities will be required.

Complete Streets Application/Potential
The corridor's multi-use trail should be complemented with additional pedestrian amenities (crosswalks, signals, etc.) at certain locations as appropriate.

RECOMMENDED IMPROVEMENTS/STRATEGIES

- Widen from Madison Boulevard to Martin Road to four lanes (Near Term; in ALDOT work program)
- Install sidewalks and appropriate crosswalks and signalization to support the multi-use trail (Longer Term)

5.5.3 Shelton Road

FINDINGS

Existing Link Volume Analysis
Traffic volumes along the two-lane Shelton Road are approximately 6,100 trips per day, resulting in a V/C ratio of approximately 0.4. No need for capacity improvements is indicated.

Projected Link Volume Analysis
By 2025, roadway volumes along Shelton Road are projected to more than double to approximately 12,500 trips per day between Old Madison Pike and Zierdt Road. The projected V/C ratio of 0.8 indicates potential peak hour needs for operational improvements by 2025. By 2040, the number of trips along the roadway will increase to 14,800 trips per day, continuing to operate at moderately congested conditions.

Intersection Analysis
The intersection of Madison Boulevard and Shelton Road was assessed for near term operational improvements. Based on the analysis, an additional eastbound left turn lane from Madison Boulevard to Shelton Road is warranted. However, this improvement appears constrained by available right-of-way.

Alternative Mode Needs
The amount of multifamily housing and potential connections to retail uses along Madison Boulevard indicate the need for sidewalks from south of the railroad crossing to Madison Boulevard.

Access Management Opportunities/Needs
Most of the corridor is already developed, but there are still some vacant properties between Old Madison Pike and the Norfolk Southern rail line. In this area, curb cuts should be minimized and aligned during future development to preserve corridor mobility.

Complete Streets Application/Potential
Current development patterns and the lack of bicycle/pedestrian connectivity do not favor Complete Streets applications along this corridor.

RECOMMENDED IMPROVEMENTS/STRATEGIES

- Install sidewalks between railroad corridor and Madison Boulevard (Longer Term)

5.5.4 Hughes Road

FINDINGS

Existing Link Volume Analysis

Hughes Road carries a uniform amount of traffic along its entire length through the city, ranging from 17,400 to 18,800 trips per day. As a result, the two-lane segments north of Old Madison Pike to Highway 72 operate at a V/C ratio of approximately 0.9, which indicates congested peak hour conditions. The four-lane segment south of Old Madison Pike operates at a current V/C of approximately 0.6, thus not requiring any capacity improvements.

Projected Link Volume Analysis

Volumes are projected to increase significantly along Hughes Road by 2025, ranging from 21,300 to 23,800 trips per day. This results in V/C ratios of over 1.1 north of Old Madison Pike, reflecting high levels of congestion and a need for more capacity. South of Old Madison Pike, volumes on the four-lane segment of Hughes Road are projected to increase by approximately 40 percent by 2025, resulting in a V/C of 0.75. There is very little increase in projected roadway volumes and congestion levels from 2025 to 2040.

Intersection Analysis

The following intersections were assessed for potential near term improvements:

- Hughes Road at Old Madison Pike/Browns Ferry Road
- Hughes Road at Eastview Drive

The intersection analysis indicates the following operational improvements are needed:

- Additional northbound left turn lane from Hughes Road to Browns Ferry Road
- Additional southbound left turn lane from Hughes Road to Old Madison Pike
- Northbound right turn lane at Hughes Road and Eastview Drive

Alternative Mode Needs

The addition of multi-use trail along the roadway has satisfied bicycle and pedestrian needs along the corridor. However, additional pedestrian amenities (crosswalks, signals, etc.) are needed at certain locations to complement the trail. The corridor's level of travel demand, concentration of retail and employment, and projected future congestion appear suitable for transit services as well.

Access Management Opportunities/Needs

Most of the corridor is already developed, so the opportunity to implement access management through new development is limited. However, field observations identified several opportunities to consolidate driveways. In addition, much of the corridor's development consists of older commercial uses, which presents potential redevelopment opportunities. The City should also look to promote driveway consolidation and realignment along the corridor. In addition, raised medians and other turn restrictions at commercial nodes along the roadway, particularly along the approaches to Old Madison Pike, should be investigated.

Complete Streets Application/Potential
The corridor's multi-use trail should be complemented with additional pedestrian amenities (crosswalks, signals, etc.) at certain locations.

RECOMMENDED IMPROVEMENTS/STRATEGIES

- Widen from Old Madison Pike to Highway 72 to four lanes (with continuous center turn lane) (Near Term)
- Install northbound right turn lane on Hughes Road at Eastview Drive (Near Term)
- Install additional northbound left turn lane from Hughes Road to Browns Ferry Road (Longer Term)
- Install additional southbound left turn lane from Hughes Road to Old Madison Pike (Longer Term)
- Install sidewalks and appropriate crosswalks and signalization to complement multi-use trail (Longer Term)
- Coordinate with Huntsville MPO and other agencies for potential transit service (Longer Term)
- Consider raised medians and other turn restrictions at Old Madison Pike (Longer Term)

5.5.5 Sullivan Street/Wall Triana Highway

FINDINGS

Existing Link Volume Analysis
The Sullivan Street/Wall Triana Highway corridor carries more traffic in the southern than northern portion of the city, with traffic volumes currently ranging from 12,400 south of Highway 72 to 20,200 near Madison Boulevard. As a two-lane roadway, the V/C ratios along the corridor range from 0.75 at the northern end to nearly 1.0 at the southern end (which does have a center turn lane south of Mill Road). Therefore, with an LOS D, there may be a need for peak hour operational improvements along Sullivan Street south of Mill Road.

Projected Link Volume Analysis
By 2025, volumes along the corridor north of Palmer Road are projected to have only a slight increase, with daily volumes along Wall Triana Highway ranging from 13,500 to 16,300 from Mill Road to Highway 72. This would result in a V/C ratio ranging from 0.83 to 0.95. This would indicate the need for a continuous center turn lane or peak hour operational improvements along the Wall Triana Highway corridor north of Mill Road by 2025. South of Mill Road on Sullivan Street, roadway volumes are projected to increase by approximately 25 percent to over 25,000 trips per day. This would result in V/C ratios ranging from 0.8 to 1.2, which reflects LOS F and congested conditions. This would indicate a potential need for capacity improvements by 2025. The projected increase in roadway volumes and congestion levels between 2025 and 2040 is minimal.

Intersection Analysis
The following intersections were assessed for potential near term improvements:

- Wall Triana Highway at Highway 72
- Wall Triana Highway at Gillespie Road
- Wall Triana Highway at Eastview Drive
- Sullivan Street at Browns Ferry Road

- Sullivan Street at Mill Road

Based on the intersection analysis, it appears that the following operational improvements are needed:

- Eastbound right turn lane and additional eastbound left turn lane from Highway 72
- Single-lane roundabout Wall Triana Highway and Gillespie Road is warranted based on volumes and turn movements at current peak hour conditions
- Single-lane roundabout at Wall Triana Highway and Eastview Drive is warranted based on volumes and turn movements at current peak hour conditions
- Single-lane roundabout at Wall Triana Highway/Sullivan Street and Browns Ferry Road is recommended based on existing and projected peak hour conditions
- Northbound right turn lane from Sullivan Street to Browns Ferry Road
- Multi-lane roundabout at Sullivan Street and Mill Road
- Northbound right turn lane from Wall Triana Highway to Mill Road
- Eastbound right turn lane from Mill Road to Sullivan Street

Alternative Mode Needs

Given surrounding land uses, sidewalks are recommended along two segments of the corridor:

- Wall Triana Highway from Gillespie Road to Eastview Drive
- Sullivan Street from Front Street to Madison Boulevard

In addition, the corridor appears suitable for transit services given the level of travel demand, concentration of retail and employment, and projected future congestion.

Access Management Opportunities/Needs

Most of the corridor is already developed, but opportunities exist to work with future developers of vacant parcels between Eastview Drive and Gillespie Road to minimize and align curb cuts and preserve mobility along the corridor. Raised medians and other turn restrictions should also be considered at Browns Ferry Road.

Complete Streets Application/Potential

Potential connections to trail facilities and surrounding retail, park, and school land uses indicate Complete Streets applications should be considered between Front Street and Madison Boulevard.

RECOMMENDED IMPROVEMENTS/STRATEGIES

- Widen Sullivan Street from Mill Road to Madison Boulevard to four lanes (with continuous turn lane) (Near Term)
- Widen Wall Triana Highway from Highway 72 to Mill Road to four lanes (with continuous turn lane) (Longer Term)
- Install continuous center turn lane from Mill Road to Gooch Lane (Near Term)
- Install single-lane roundabout at Wall Triana Highway and Gillespie Road (Longer Term)
- Install single-lane roundabout at Wall Triana Highway and Eastview Drive (Longer Term)
- Install northbound right turn lane from Wall Triana Highway to Browns Ferry Road (Near Term)
- Install single-lane roundabout at Wall Triana Highway and Browns Ferry Road (Longer Term)
- Install northbound right turn lane from Sullivan Street to Mill Road (Near Term)

- Install multi-lane roundabout at Sullivan Street/Wall Triana Highway and Mill Road (Longer Term)
- Install sidewalks from Gillespie Road to Eastview Drive (Near Term)
- Install sidewalks from Browns Ferry Road to Mill Road (Near Term)
- Install bicycle lanes on Sullivan Street from Front Street to Madison (Longer Term)
- Add 'Share the Road' signage and/or pavement markings along roadway (Near Term)
- Coordinate with Huntsville MPO and other agencies for potential transit service (Longer Term)
- Implement Complete Street applications along corridor (Longer Term)

5.5.6 Balch Road

FINDINGS

Existing Link Volume Analysis
Traffic volumes along the two-lane Balch Road range from approximately 8,600 to 8,900 trips per day, resulting in a V/C ratio of approximately 0.5. Capacity improvements are not currently needed.

Projected Link Volume Analysis
Located in one of the more rapidly growing areas of the city, roadway volumes along Balch Road are projected to increase by roughly 40 percent by 2025, ranging from 12,100 and 12,900 trips per day. This represents a V/C ratio of approximately 0.7 throughout the corridor. By 2040, volumes are projected to increase to 13,500 trips per day, resulting in a slightly worse V/C of 0.75. No capacity improvements appear needed by 2040.

Intersection Analysis
A roundabout is currently planned at Balch Road and Gillespie Road. An assessment of potential near term improvements confirmed a single-lane roundabout is appropriate for this location based on existing and projected peak hour conditions. This improvement is already in the work program.

Alternative Mode Needs
Given its proximity to the Mill Creek and Bradford Creek greenways and nearby schools, the Balch Road corridor should be considered for bicycle facilities. The segment between Elaine Drive and Columbia Elementary would also be appropriate for sidewalks as development continues along the roadway.

Access Management Opportunities/Needs
Most of the corridor is already developed, but some vacant properties still exist. Opportunities exist to work with developers at these locations to minimize and align curb cuts to preserve corridor mobility.

Complete Streets Application/Potential
Given the connections to trail facilities and surrounding retail, park and school land uses, Complete Streets applications should be considered from Mill Road to Gillespie Road.

RECOMMENDED IMPROVEMENTS/STRATEGIES

- Install single-lane roundabout at Balch Road and Gillespie Road (Near Term; in ALDOT work program)

- Add 2 feet of lanes on each side of Balch Road from Browns Ferry Road to Gooch Lane (Near Term; in ALDOT work program)
- Install multi-use path or bike lanes from Elaine Drive to Gillespie Road (Longer Term)
- Install sidewalks along roadway north of Elaine Drive to Highway 72 (Near Term)
- Add 'Share the Road' signage and/or pavement markings along roadway (Near Term)
- Implement Complete Streets applications (Longer Term)

5.5.7 County Line Road

FINDINGS

Existing Link Volume Analysis

Recently widened to a four-lane facility, County Line Road currently has a roadway volume of approximately 15,200 trips per day north of Gillespie Road and approximately 20,000 south of Gillespie Road. As a result, current levels of congestion are approaching LOS E, with a V/C ratio of approximately 0.6 north throughout the entire length of the corridor. Therefore, it appears that no capacity improvements are needed at this time.

Projected Link Volume Analysis

By 2025, volumes are projected to increase, ranging from 18,800 north of Gillespie Road to 22,800 south of Gillespie Road. The resulting V/C ratios of 0.6 to 0.7 reflect no need for additional capacity by 2025. There is very little increase in roadway volumes and congestion levels between 2025 and 2040.

Intersection Analysis

The following intersections were assessed for potential near term improvements:

- County Line Road at Madison Boulevard
- County Line Road at Mill Road
- County Line Road at Gillespie Road/Huntsville-Browns Ferry Road

The intersection analysis indicates the following operational improvements are needed:

- Additional southbound left turn lane from County Line Road to Mill Road.
- Additional northbound right turn lane from County Line Road to Mill Road.
- Northbound right turn lane from County Line Road to Gillespie Road.

Alternative Mode Needs

With the recent addition of the multi-use trails along the roadway, bicycle and pedestrian needs along the corridor have been satisfied. However, additional pedestrian amenities (crosswalks, signals, etc.) are needed at certain locations to complement the trail.

Access Management Opportunities/Needs

Because much of the development along the corridor is relatively recent, most curb cuts and access points are aligned throughout the corridor. However, opportunities exist to work with future developers of available land parcels to preserve corridor mobility by minimizing and aligning curb cuts. This is particularly true for the portion of the corridor between Mill Road and Madison Boulevard.

Complete Streets Application/Potential

The multi-use trail along the corridor already exemplifies Complete Streets.

RECOMMENDED IMPROVEMENTS/STRATEGIES

- Install northbound right turn lane at County Line Road and Mill Road (Longer Term)
- Install northbound right turn lane at County Line Road and Gillespie Road (Longer Term)
- Install pedestrian amenities at appropriate locations along the corridor to complement multi-use trail (Longer Term)
- Apply access management practices from Mill Road to Madison Boulevard (Longer Term)

5.5.8 Burgreen Road

FINDINGS

Existing Link Volume Analysis

A two-lane roadway with traffic volumes of approximately 5,000 trips per day and a V/C ratio of approximately 0.3, Burgreen Road is not operating at congestion conditions. No immediate roadway improvements are needed.

Projected Link Volume Analysis

Roadway volumes are projected to increase to approximately 8,300 trips per day in 2025 and 9,700 trips per day by 2040. Projected V/C ratios of 0.5 in 2025 and 0.6 in 2040 indicate capacity improvements are not needed by 2040. It should be noted that a median and center turn pockets was recommended along the corridor as part of the West Side Master Plan. While not warranted by the projected volume and V/C ratio along the roadway, the improvement would further the overall vision of the West Side Master Plan and enhance the overall urban context of the area.

Intersection Analysis

No intersection analysis was performed along the corridor. It should be noted that the West Side Master Plan recommends a roundabout at the intersection of Burgreen Road and Powell Road. While projected travel demand does not indicate a need for the improvement to improve operational characteristics, the improvement will support the overall vision for the West Side Master Plan from an urban context perspective.

Alternative Mode Needs

It should be noted that the West Side Master Plan recommended the installation of a multi-use trail along the roadway to promote its overall vision. Given the relatively undeveloped nature of the corridor, coordination with developers should be considered as a strategy to help develop the multi-use trail. Sidewalks as well as 'Share the Road' signage and markings along the corridor may appropriate interim steps as development continues to occur to promote bicycle and pedestrian travel in the area.

Access Management Opportunities/Needs

Given the amount of undeveloped land throughout the corridor, opportunities exist to work with developers to minimize and align curb cuts to preserve access along the corridor.

Complete Streets Application/Potential

As part of the recommendations of the West Side Master Plan, the Burgreen Road Corridor is recommended for Complete Streets. The undeveloped nature of the corridor presents an opportunity

for Complete Streets applications from a right-of-way perspective as well as that to work with developers to assist in the implementation of Complete Streets treatments.

RECOMMENDED IMPROVEMENTS/STRATEGIES

- Install center turn pockets and median from Hardiman Road to Highway 72 (Longer Term)
- Install roundabout at Burgreen Road and Powell Road (Longer Term)
- Add 'Share the Road' signage and/or pavement markings along roadway (Longer Term)
- Implement Complete Streets applications (including multi-use trail) (Longer Term)

5.6 IMPROVEMENTS ALONG OTHER CORRIDORS

In addition to the projects along the major corridors and in the West Side, there are also several projects along other corridors of the City. Other than the new I-565 interchange, all are bicycle projects. These projects, along with how they were identified and their recommended implementation timeframe based on the assessment criteria developed for 2040-TP are provided below:

- Construct interchange on I-565 near Zierdt Road – This project is part of the Town Madison development and serves more trips than any other operations project in the City. It is being constructed by the Town Madison developers and is expected to be complete prior to 2025.
- Highland Drive Bicycle Facilities – Initially identified in the City's Trails and Greenway Master Plan, this improvement is recommended for implementation in the near term because it serves nearby neighborhoods and increases bicycle connectivity to the Hughes Road multi-use trail, Dublin Park, and nearby schools.
- Maple Street Bicycle Facility from Madison Station to Skate Park (including off-street segment) – Identified in the *2025 Parks and Recreation Master Plan*, this project is recommended for consideration as a longer term improvement based on its ability to connect Hughes Road to the Downtown area.

5.7 WEST SIDE MASTER PLAN IMPROVEMENTS

In addition to the projects along the Burgreen Road and Hardiman Road corridors, below are several other projects and strategies that have been identified that promote the overall vision of the West Side Master Plan. As shown, these improvements consist of new roadways to provide better connectivity throughout the area and the implementation of Complete Streets along these roadways.

- Extension of the north-south section of Powell Road to Holladay Drive as a four-lane roadway
- New local road that connects Morris Drive to Henderson Lane
- New minor collector from Hardiman Road to Segers Road to serve as an additional east-west connection
- New road that connects to Highway 72 west of Holladay Boulevard
- Roundabout at Powell Road and Segers Road
- New road that connects Hardiman Road to Morris Drive
- New road that connects from the vicinity of Cedar Acres Drive to Acorn Way
- West Side Complete Streets (including sidewalks and multi-use trails)

These proposed improvements are included on the West Side Master Plan Vision Map (Figure 2-8).

Based on the volumes and V/C ratios projected along the roadways on the West Side (see Section 4 for more information), the new roadways and roundabout presented above and operational improvements noted in the corridor assessment are not necessarily needed to relieve existing and projected congestion in the area. With that said, by providing parallel relief to the existing roadways and increasing overall roadway connectivity within the area provides two important transportation benefits – 1) a more robust network to serve additional trips should the travel demand and congestion levels projected by the travel demand model be understated and 2) better system resiliency in the event of roadway closures due to either maintenance and/or emergency situations.

In addition to fostering the overall urban context envisioned for the area, the most obvious benefit of implementing the Complete Streets recommended throughout the West Side is the promotion of travel via bicycling and walking. As noted within the West Side Master Plan, the development of a network with other mobility options rather the automobile also provides mobility options for a wider range of residents who are either too young to drive or choose not to drive. The development of a robust bicycle and pedestrian network in the West Side also promotes the utility of previous investments in other facilities such as the County Line Road multi-use trail and the Mill Creek and Bradford Creek Greenways. Lastly, given the relatively undeveloped nature of the West Side there is much more opportunity to implement Complete Streets in the area when compared to the remainder of the City.

As this portion of the City continues to develop, the City should explore opportunities to implement the transportation recommendations of the West Side Master Plan based on the benefits noted above. Furthermore, given the undeveloped nature of the area, the City has a greater opportunity to work with developers to assist in the development of the recommended network.

5.8 GREENWAYS AND TRAILS PLANNING

A key initiative of the City of Madison is promoting the development of a comprehensive greenways and trails system. Per input from City staff, greenways would be facilities that are not along roadways and, as such, would include facilities such as the Mill Creek, Bradford Creek and Oakland Springs Branch Greenways. Side Paths would be multi-use facilities located along roadways, such as those along Hughes Road and County Line Road, and Nature Surface Trails are unpaved trails such as those on Rainbow Mountain. Figure 4-5 shows planned and contemplated facilities throughout the City. As a follow-up activity to this plan, City staff will be refining the facilities shown on this map to develop a comprehensive vision for the City's bicycle and pedestrian network.

5.9 SUMMARY OF NEAR TERM AND LONGER TERM RECOMMENDATIONS

Appendix B-2 identifies the improvements recommended for implementation as part of the 2040-TP. Recommended improvement projects are prioritized for implementation into one of two timeframes:

- Near Term – Now to 2025
- Longer Term – Beyond 2025 through 2040

Potential improvements that are not recommended for implementation in the 2040-TP are also indicated. Although these projects were identified from previous studies or as a part of the 2040-TP

analysis activities, these projects were determined to not be needed based on current and projected conditions or are outside the scope of the current study.

Several important points should be taken into account:

- Projects currently funded in the ALDOT and City of Huntsville work programs through 2040 were not re-assessed, based on the assumption that these projects had already been evaluated and well-vetted with community leaders.
- Access management strategies and Complete Streets applications were all assigned for longer term implementation given that they typically comprise multiple improvements. However, the exception is Highway 72 access management strategies, which could be implemented as part of the widening project scheduled for 2019.
- Due to the level of coordination needed between the City and other regional partners for its implementation, potential transit routes were also considered as longer term improvements.

The implementation timeframe for projects/strategies recommended in 2040-TP, determined based on the evaluation factors presented at the beginning of this section, is as follows:

- 37 near term recommendations
    - 6 capacity improvements
    - 11 operations improvements
    - 19 bicycle/pedestrian improvements
    - 1 access management strategy (associated with the widening of Highway 72)
- 61 longer term recommendations
    - 9 capacity improvements
    - 15 operations improvements
    - 18 bicycle/pedestrian improvements
    - 4 transit routes/corridors
    - 3 access management corridors/locations
    - 11 Complete Streets corridors and one area initiative (West Side)
- 16 projects were not included in recommendations
    - 11 capacity improvements
    - 2 operations improvements
    - 3 bicycle/pedestrian projects

Section 6 contains a more detailed description of the projects and strategies recommended for near term implementation.

6.0 NEAR TERM PROJECTS AND COSTS

More detailed information regarding the projects recommended for near term implementation (through year 2025) is presented in this final section. This information will be particularly helpful to City officials when determining priorities for future investments. Specifically, this section provides:

- An overview of near term projects and the rationale for their recommendation
- Cost estimates for recommended near term projects not already included in the ALDOT work program
- A generalized description of potential funding sources for future transportation projects

It should also be noted that many factors impact the actual implementation timeframe of recommended projects. For example, a recommended project must be included in the City's Capital Improvements Program. Other factors include:

- Project costs and available funding – Projects with higher capital costs may require more time for interagency coordination and/or to acquire funding.
- Relationship to other proposed projects – Multiple proposed projects along the same corridor, as well as projects that serve similar needs on another corridor (such as adding north-south capacity or improving operations at the same intersection), may affect the recommended implementation timeframe.
- Local support – While some projects may reflect greater need based on the assessment factors detailed in the 2040-TP, input from City staff, the Steering Committee, and the public ultimately dictates program priorities.

6.1 NEAR TERM CITY OF MADISON 2040-TP PROGRAM

Table 6-1 summarizes the projects recommended for near term implementation. Within the table, projects are grouped by improvement type—capacity, operations, bicycle and pedestrian facilities, and access management. The project source and comments/assessment are also provided. A map of the near term recommendations is provided as Figure 6-1. The project numbers for the near term improvements correspond with those in Appendix B-2. As previously noted, the east-west (EW) corridors are ordered from north to south, while the north-south (NS) corridors are ordered from east to west.

Table 6-1: Recommended Near Term Projects in the 2040-TP

2040-TP Project ID	Project Considered[3]	Project Source	Comments / Assessment
Capacity Improvements			
EW-1	Widen Highway 72 from 4 to 6 lanes from County Line Road to Providence Main Boulevard	ALDOT Work Program	Not assessed; currently in ALDOT work program (2019). Travel demand modeling validates need.
EW-48	Widen Madison Boulevard from 4 to 6 lanes from County Line Road to east of Madison	Madison 2040-TP Travel Demand Modeling	2025 projected V/C levels reflect need.
NS-1	Widen Slaughter Road from 2 to 4 lanes from Highway 72 to Old Madison Pike	ALDOT Work Program	Not assessed; currently in ALDOT work program (2034). Travel demand modeling validates need; projected 2025 V/C ratio indicates needed prior to 2025.
NS-5	Widen Zierdt Road from 2 to 4 lanes from Madison Boulevard to south of Madison	ALDOT Work Program	Not assessed; currently in ALDOT work program (2018). Travel demand modeling validates need.
NS-11	Widen Hughes Road from 3 to 4 lanes from Old Madison Pike to Highway 72	Madison 2040-TP Travel Demand Modeling Huntsville MPO 2040 LRTP (Visionary)	2025 projected V/C levels reflect need.
NS-18	Widen Sullivan Street from 3 to 4 lanes from Mill Road to Madison Boulevard	Madison 2040-TP Travel Demand Modeling Huntsville MPO 2040 LRTP (Visionary)	2025 projected V/C levels reflect need.
Operations Improvements			
EW-4	Eastbound left turn lane on Highway 72 at Wall Triana Highway	Madison 2040-TP Intersection Analysis	Identified as immediate need per Intersection Analysis. Opportunity to coordinate with ALDOT and City of Huntsville to incorporate into widening project.
EW-5	Eastbound right turn lane on Highway 72 at Wall Triana Highway	Madison 2040-TP Intersection Analysis	Identified as immediate need per Intersection Analysis. Opportunity to coordinate with ALDOT and City of Huntsville to incorporate into widening project.
EW-33	Eastbound right turn lane from Mill Road to Sullivan Street	Madison 2040-TP Intersection Analysis	Identified as immediate need per Intersection Analysis.

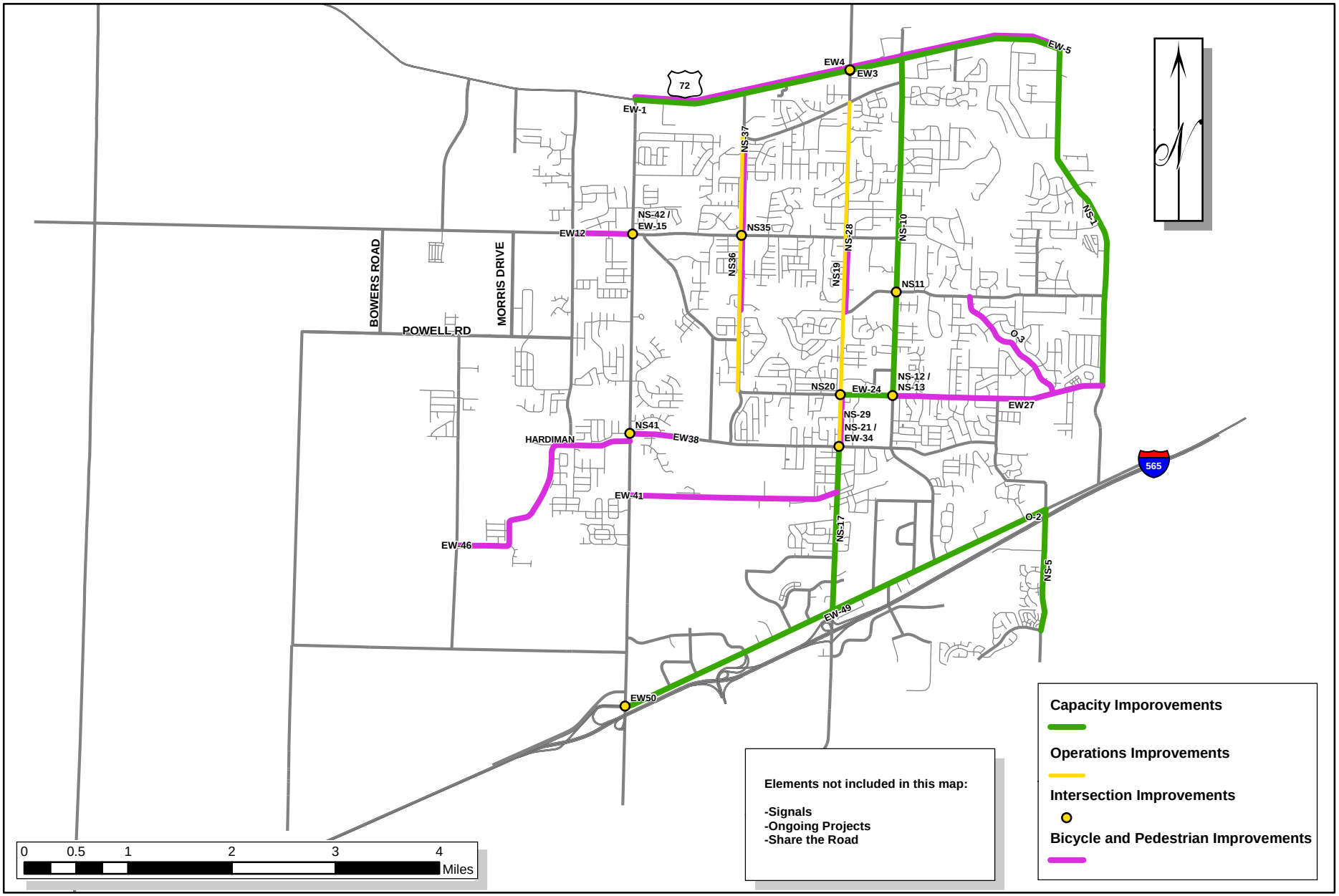
[3] All capacity improvements are assumed to include either a continuous center turn lane or a median with left turn lanes.

2040-TP Project ID	Project Considered[3]	Project Source	Comments / Assessment
EW-49	Additional westbound right turn lane from Madison Boulevard to County Line Road	Madison 2040-TP Intersection Analysis	Identified as immediate need per Intersection Analysis.
NS-12	Northbound right turn lane from Hughes Road to Eastview Drive	Madison 2040-TP Intersection Analysis	Identified as immediate need per Intersection Analysis.
NS-20	Center turn lane on Wall Triana Highway from Mill Road to Gooch Lane	Madison 2040-TP Travel Demand Modeling	2025 projected V/C levels reflect need.
NS-21	Northbound right turn lane from Wall Triana Highway to Browns Ferry Road	Madison 2040-TP Intersection Analysis	Identified as immediate need per Intersection Analysis.
NS-22	Northbound right turn lane from Sullivan Street to Mill Road	Madison 2040-TP Intersection Analysis	Identified as immediate need per Intersection Analysis.
NS-36	Roundabout at Balch Road and Gillespie Road	ALDOT Work Program	Not assessed; currently in ALDOT work program (2018). Need validated through Intersection Analysis.
NS-37	Add 2 feet of lanes on each side of Balch Road from Browns Ferry Road to Gooch Lane	ALDOT Work Program	Not assessed; currently in ALDOT work program (2018).
O-1	Construct interchange on I-565 near Zierdt Road	ALDOT Work Program	Not assessed; currently in ALDOT work program (prior to 2025).
Bicycle Facilities			
EW-29	Old Madison Pike bicycle facilities	Madison 2040-TP Qualitative Assessment	Connectivity to key destinations or other facilities.
EW-40	Palmer Road/Front Street bicycle facilities	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025	Connectivity to key destinations or other facilities.
O-2	Highland Drive bicycle facilities	Madison 2040-TP Qualitative Assessment Madison Greenway and Trails Master Plan	Connectivity to key destinations or other facilities.
Share the Road Corridors			
EW-14	Huntsville-Browns Ferry Road “Share the Road” Signage and/or Pavement Markings	Madison 2040-TP Qualitative Assessment	High bicycle suitability. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.
EW-19	Gillespie Road “Share the Road” Signage and/or Pavement Markings	Madison 2040-TP Qualitative Assessment	High bicycle suitability. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.

2040-TP Project ID	Project Considered[3]	Project Source	Comments / Assessment
EW-23	Eastview Drive "Share the Road" Signage and/or Pavement Markings	Madison 2040-TP Qualitative Assessment	High bicycle suitability. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.
EW-25	Browns Ferry Road "Share the Road" Signage and/or Pavement Markings from Balch Road to Gillespie Road	Madison 2040-TP Qualitative Assessment	High bicycle suitability. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.
EW-38	Mill Road "Share the Road" Signage and/or Pavement Markings	Madison 2040-TP Qualitative Assessment	High bicycle suitability. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.
EW-41	Palmer Road "Share the Road" Signage and/or Pavement Markings	Madison 2040-TP Qualitative Assessment	High bicycle suitability. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.
EW-45	Hardiman Road "Share the Road" Signage and/or Pavement Markings	Madison 2040-TP Qualitative Assessment	High bicycle suitability. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.
NS-32	Sullivan Street/Wall Triana Highway "Share the Road" Signage and/or Pavement Markings	Madison 2040-TP Qualitative Assessment	High bicycle suitability. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.
NS-40	Balch Road "Share the Road" Signage and/or Pavement Markings	Madison 2040-TP Qualitative Assessment	High bicycle suitability. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.
NS-48	Burgreen Road "Share the Road" Signage and/or Pavement Markings	Madison 2040-TP Qualitative Assessment	High bicycle suitability. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.
Sidewalks			
EW-6	Highway 72 sidewalks and pedestrian signals	Madison Growth Plan Madison 2040-TP Qualitative Assessment	Connectivity to key destinations or other facilities.
EW-13	Huntsville-Browns Ferry Road sidewalks – Burgreen Road to County Line Road	Madison 2040-TP Qualitative Assessment	Connectivity to key destinations or other facilities.
EW-37	Mill Road sidewalks – County Line Road to Bradford Creek Trail	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025	Connectivity to key destinations or other facilities.
NS-29	Wall Triana Highway sidewalks – Gillespie Road to Eastview Drive	Madison 2040-TP Qualitative Assessment	Connectivity to key destinations or other facilities.

2040-TP Project ID	Project Considered[3]	Project Source	Comments / Assessment
NS-30	Sullivan Street sidewalks – Browns Ferry Road to Mill Road	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025	Connectivity to key destinations or other facilities. Potential to incorporate into recommended capacity improvement for near term.
NS-38	Balch Road sidewalks – Elaine Drive to south of Highway 72	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025 Madison Greenway and Trails Master Plan	Connectivity to key destinations or other facilities. Project limits changed to reflect current needs per analysis.
Access Management			
EW-9	Access management strategies – Highway 72 from County Line Road to Slaughter Road	Madison Growth Plan Madison 2040-TP Corridor Assessment	Opportunity to coordinate with ALDOT and City of Huntsville to ensure proper access management applications during widening project.

Figure 6-1: Recommended Near Term Projects in the 2040-TP



6.1.1 Capacity Projects

Capacity improvements recommended for near term implementation are listed below, along with the recommendation rationale. Generally speaking, capacity recommendations are due to existing and/or projected travel demand, V/C ratios, and/or inclusion in the current ALDOT work program.

- Widen Highway 72 from 4 to 6 lanes from County Line Road to Providence Main Boulevard – Currently in the ALDOT work program, the segment of Highway 72 east of Hughes Road carries the highest traffic volumes of any east-west surface street in the city, with over 42,000 trips per day. As a result of these volumes, the V/C ratio along this segment is 1.25, which is well above the threshold indicating the need for additional capacity.
- Widen Hughes Road from 3 to 4 lanes (with center turn lane) from Old Madison Pike to Highway 72 – With volumes ranging from 17,000 to 18,000 trips per day, this segment of Hughes Road is the second most traveled two-lane north-south roadway in the city. By 2025, volumes along this segment are expected to increase by over 20 percent to roughly 23,000 trips per day. This projected increase results in V/C ratios ranging from 1.01 to 1.13 throughout the corridor, indicating the need for additional capacity.
- Widen Slaughter Road from 2 to 4 lanes from Highway 72 to Old Madison Pike – Currently in the ALDOT work program for 2034, projected volumes of approximately 19,000 trips per day and a V/C ratio of 1.09 by 2025 indicate the need for completion of this improvement in the near term.
- Widen Sullivan Street from 3 to 4 lanes (with center turn lane) from Mill Road to Madison Boulevard – This segment of Sullivan Street currently carries over 20,000 trips per day with a V/C ratio approaching 1.0. By 2025, volumes are projected to increase by 25 percent to over 25,000 trips per day. This results in a projected V/C ratio of 1.21, which is well over the threshold indicating a need for additional capacity.
- Widen Zierdt Road from 2 to 4 lanes from Madison Boulevard to South of Madison – Scheduled in the ALDOT work program to begin in 2018, the widening of Zierdt Road to 4 lanes is justified primarily due to the high growth rate projected through 2025. While current traffic counts are over 16,000 trips per day, volumes are projected to more than double by 2025 to over 33,000 trips per day. With a current V/C ratio approaching 1.0, this additional travel demand warrants completion of the project as planned.
- Widen Madison Boulevard from 4 to 6 lanes from County Line Road to east of Madison – With traffic volumes of 24,000 to 29,000 trips per day, Madison Boulevard is the second most traveled east-west surface street within the city. Projected growth from Town Madison drives increases in traffic volumes exceeding 20 percent, resulting in volumes of 29,000 to 35,000 trips per day and projected V/C ratios of over 1.0 throughout the corridor. The new I-565 interchange near Zierdt Road will also impact the corridor.

6.1.2 Operations Projects

Of the near term recommended projects, most improvements are either currently in the ALDOT work program or provide additional turn lanes at intersections. This need was identified through the peak hour intersection analysis detailed in Section 4. Below is a description of the near term operational improvements and the rationale for their recommendation:

- Interchange on I-565 near Zierdt Road – Associated with the Town Madison development and scheduled for construction prior to 2025, this new interchange will increase access to city roadways from I-565 and will carry more traffic than any other operations projects. This project provides for improved access to surrounding roadways; actual interchange construction is being completed by the developers of Town Madison.
- Roundabout at Balch Road and Gillespie Road – Currently scheduled for construction in 2018, the need for this improvement was validated through the 2040-TP intersection analysis.
- Add 2 feet of lanes on each side of Balch Road from Browns Ferry Road to Gooch Lane – Also scheduled for construction in 2018, this improvement will improve safety along the Balch Road corridor. The additional lane width will also increase the corridor's suitability for bicycle travel.
- Center turn lane on Wall Triana Highway from Mill Road to Gooch Lane – With daily volumes ranging from 12,000 to 16,000 trips per day and V/C ratios ranging from 0.85 to 1.0, this roadway is one of the city's most traveled north-south corridors. These conditions reflect a need for a continuous center turn lane to help operations along the corridor.
- Additional eastbound left turn lane and new right turn lane on Highway 72 at Wall Triana Highway – Identified through the intersection analysis, this improvement serves to alleviate an operational deficiency at this intersection of two heavily traveled roadways—Highway 72 (28,000 trips per day) and Wall Triana Highway (16,000 trips per day). The scheduled widening of Highway 72 may provide an opportunity to include one or both of these enhancements into the project design.
- Eastbound right turn lane from Mill Road to Sullivan Street and northbound right turn lane from Sullivan Street to Mill Road – The intersection analysis identified these projects as immediate peak hour needs, and the volumes along this segment of Mill Road are projected to increase from approximately 9,000 to 14,000 trips per day by 2025. With this increase in volumes, the V/C ratio along this segment of Mill Road is projected to approach 1.0 by 2025. The corresponding segment of Sullivan Street is currently operating at a V/C ratio approaching 1.0, which represents significant congestion.
- Additional westbound right turn lane from Madison Boulevard to County Line Road – The 2040-TP intersection analyses also identified this project as an immediate peak hour need, with current traffic volumes at nearly 20,000 trips per day along both roadways. Volumes along this segment of Madison Boulevard, which is a high growth area, are projected to increase by over 40 percent to more than 27,000 trips per day by 2025.
- Northbound right turn lane from Hughes Road to Eastview Drive – An immediate peak hour need according to the intersection analysis results, current traffic volumes along Hughes Road at this location are approximately 19,000 trips per day, and are expected to increase by over 25 percent to approximately 24,000 trips per day by 2025. This particular location also has high turn movements related to school and commuter traffic.

- Northbound right turn lane from Wall Triana Highway to Browns Ferry Road – The intersection analysis indicates this is an immediate peak hour need, with current traffic volumes along Wall Triana Highway at this location of approximately 16,000 trips per day and a corresponding V/C ratio approaching 1.0. This intersection also serves nearby commercial uses.

6.1.3 Bicycle and Pedestrian Projects

The near term project recommendations include three bicycle facility projects (bike lanes or adjacent multi-use paths), six sidewalk projects, and a number of "Share the Road" improvements along certain corridors. Recommended bicycle and sidewalk projects are described below.

- Highland Drive bicycle facilities – Bicycle facilities along Highland Drive would improve connectivity to the Hughes Road multi-use trail, Dublin Park, and nearby schools. While there appears to be adequate right-of-way, existing speed humps along the roadway will need to be modified to accommodate this improvement.
- Old Madison Pike bicycle facilities – Old Madison Pike provides connectivity to the multi-use trail and retail uses along Hughes Road, the nearby Indian Creek Greenway in Huntsville, and connections to nearby schools and residential neighborhoods. Given its access to employment centers to the east of the city, Old Madison Pike is one of the most favorable corridors for potential bicycle commuters.
- Bicycle facilities on Palmer Road/Front Street – Providing a connection between County Line Road multi-use trail, Palmer Park, Bradford Creek Greenway and downtown, this improvement would serve to substantially increase the overall connectivity of the City's bicycle network.
- Highway 72 sidewalks and pedestrian signals – Although existing development along the corridor is not pedestrian-friendly, the commercial uses along Highway 72 generate travel demand for a wide range of services. The installation of sidewalks and associated pedestrian signals would increase the safety for pedestrians who do access the corridor. It is assumed that this project will be part of the Highway 72 widening project scheduled for 2019.
- Wall Triana Highway sidewalks from Gillespie Road to Eastview Drive – Sidewalks along this segment of Wall Triana Highway would provide connectivity to churches, multifamily residential, and higher density single family residential uses along the corridor. This sidewalk would also connect to the Eastview multi-use trail accessing Bob Jones High School.
- Sullivan Street sidewalks from Browns Ferry Road to Mill Road – Sidewalks along this corridor would provide pedestrian connectivity to Madison Elementary School, higher density residential development, and commercial uses on Browns Ferry Road.
- Mill Road sidewalks from County Line Road to Bradford Creek Trail – This sidewalk provides a connection between the Bradford Creek Greenway, Mill Creek Greenway and County Line Road multi-use trail. This improvement would also be the first step in developing Complete Streets applications along the roadway.
- Balch Road sidewalks from Elaine Drive to south of Highway 72 – Sidewalks along this corridor would build upon the existing multi-use path from south of Elaine Drive to Mill Creek Greenway. This improvement would also be the first step in providing bicycle facilities along this segment and Complete Street applications along Balch Road, both of which are longer term recommendations.

- Huntsville-Browns Ferry Road sidewalks from Burgreen Road to County Line Road – Filling gaps in the existing sidewalks will provide connectivity to County Line Road's retail uses and multi-use trail. Located within a projected high growth area, there may be opportunities to work with developers for these improvements.

An interim, lower-cost means of establishing bicycle travel and improving bicycle safety along corridors with higher bicycle suitability is installing "Share the Road" signage and/or pavement markings. "Share the Road" accommodations are recommended along the following corridors:

- Huntsville-Browns Ferry Road
- Gillespie Road
- Eastview Drive
- Browns Ferry Road
- Mill Road
- Palmer Road/Front Street
- Hardiman Road
- Sullivan Street/Wall Triana Highway
- Balch Road
- Burgreen Road

6.1.4 Access Management Strategies

Given its scheduled construction in 2019, the widening of Highway 72 presents an opportunity to ensure proper access management techniques along the corridor in the near term. Access management is a key design component of the ALDOT review process prior to approval of roadway improvements.

6.2 COST ESTIMATES

Information from the ALDOT Cost Estimator tool was used to derive planning-level cost estimates for recommended near term projects that are not in the ALDOT work program. For intersection turn lane improvements, costs were developed based on recent bid packages in and around the City of Madison. Several key points related to the cost estimates are listed below:

- Capacity projects are typically much more expensive than operational improvements. For the purposes of this analysis, all improvements were estimated to be open shoulder widenings with a unit cost of over $2 million per mile. Widenings with curb, gutter, and drainage improvements are costlier, at an estimated unit cost of roughly $2.9 million per mile.
- At an estimated unit cost of $1.3 million per mile, the continuous center turn lane along Wall Triana Highway from Mill Road to Gooch Lane is the costliest operations project not in the ALDOT work program. With a project length of approximately 3 miles, the estimated cost of this improvement is approximately $3.9 million.
- Most of the near term recommended operations projects are turn lane additions, which range in cost from $75,000 to $100,000.
- Turn lane improvements were identified at three intersections that are also candidates for roundabouts in the long term based on projected traffic volumes. Future needs should be fully considered prior to investing in the lower cost turn lane improvements.

- The Highway 72 sidewalks and pedestrian signals improvement is by far the most expensive bicycle/pedestrian project, primarily due to the corridor's length. Given the corridor's planned widening in 2019, the City should coordinate with ALDOT and the City of Huntsville for their inclusion in the project's design.
- At a length of approximately 2.3 miles, adding sidewalks along Balch Road is the second most costly sidewalk project, estimated at $618,750. The remainder of sidewalk projects, which are all much shorter in length, range from roughly $140,000 to $210,000.
- More detailed analysis is needed to determine whether the corridors rating highest for bicycle facilities are more suited for bicycle lanes or multi-use trails. Therefore, the cost estimates for bicycle facilities were based on a unit cost of $200,000 per mile, which reflects a rough average of the general unit cost for bike lanes ($165,000 per mile, without curb and gutter) and multi-use paths ($250,000 per mile).

Table 6-2 provides cost estimates for recommended near term projects. Right-of-way and extensive utilities costs are not included. In addition, future adjustments should be expected to reflect accurate right-of-way, construction and materials costs at the time of project implementation.

Table 6-2: Cost Estimates for Near Term Projects

Capacity Improvements	**Estimated Cost**
Widen Sullivan Street from 3 to 4 lanes (with center turn lane) from Mill Road to Madison Boulevard	$ 3,238,170
Widen Hughes Road from 3 to 4 lanes (with center turn lane) from Old Madison Pike to Highway 72	$ 6,476,339
Widen Madison Boulevard from 4 to 6 lanes (with median and turn lanes) from County Line Road to east of Madison	$ 10,119,280
TOTAL CAPACITY	**$ 19,833,789**
Operations Improvements	**Estimated Cost**
Eastbound left turn lane on Highway 72 at Wall Triana Highway*	$ 100,000
Eastbound right turn lane on Highway 72 at Wall Triana Highway*	$ 100,000
Eastbound right turn lane from Mill Road to Sullivan Street	$ 75,000
Additional westbound right turn lane from Madison Boulevard to County Line Road	$ 100,000
Northbound right turn lane from Hughes Road to Eastview Drive	$ 75,000
Center turn lane on Wall Triana Highway from Mill Road to Gooch Lane	$ 3,900,000
Northbound right turn lane from Wall Triana Highway to Browns Ferry Road	$ 75,000
Northbound right turn lane from Sullivan Street to Mill Road	$ 75,000
TOTAL OPERATIONS	**$ 4,500,000**
Alternative Modes Improvements**	**Estimated Cost**
Highland Drive Bicycle Facilities	$ 231,000
Palmer Road/Front Street Bicycle Facilities	$ 420,000
Old Madison Pike Bicycle Facilities	$ 440,000
Wall Triana Highway Sidewalks - Gillespie Road to Eastview Drive	$ 206,250
Balch Road Sidewalks - Elaine Drive to south of Highway 72	$ 618,750
Mill Road Sidewalks - County Line Road to Bradford Creek Trail	$ 151,250
Highway 72 Sidewalks and Pedestrian Signals*	$ 1,100,000
Sullivan Street Sidewalks - Browns Ferry Road to Mill Road	$ 137,500
Huntsville-Browns Ferry Road Sidewalks - Burgreen Road to County Line Road	$ 165,000
TOTAL ALTERNATIVE MODES	**$ 3,469,750**

* Potential to coordinate with ALDOT and City of Huntsville to incorporate into widening project
** Does not include "Share the Road" signage and pavement markings
NOTE: Table does not contain costs for projects currently within the ALDOT work program.

Sources: ALDOT Cost Estimator Tool, http://alletting.dot.state.al.us/OfficeEngineer/EstimatorCatgDown.htm, December 2017; Operational Improvements based on recent local bid packages for similar projects.

6.3 POTENTIAL NEAR AND LONGER TERM FUNDING SOURCES

An overview of some potential funding sources available to the City of Madison for future transportation projects is provided in the following paragraphs. Potential funding primarily consists of federal, state and local sources but varies depending on project type (roadway, trails, etc.). It should be noted that the City should explore additional funding opportunities that may arise for potential applicability.

6.3.1 Federal Funding

All of the federal funding for the Huntsville region is managed through the Huntsville MPO, which is staffed by City of Huntsville. While there are several different sources of federal funding, most are dedicated for use on the federally-designated National Highway System (NHS). The only surface street on the NHS within the City of Madison is Highway 72. Therefore, the most applicable federal source of funding for improvements within the City of Madison is the Surface Transportation Program (STP). The STP provides flexible funding for use by local governments to preserve and improve the condition and performance on any public road, for pedestrian and bicycle infrastructure, and transit capital projects.

Another federal funding source applicable to Madison is the Recreational Trails Program (RTP). Administered by the Alabama Department of Economic and Community Affairs (ADECA), this program provides funding assistance to local governments and nonprofit organizations for the development and improvement of recreational trails.

Pertinent factors regarding the use of any federal funds for transportation improvements include:

- Federal funds typically require a 20 percent match from ALDOT or local governments.
- All roadway projects funded through federal funds must demonstrate an accommodation for bicycle and pedestrian travel.
- Use of federal funds also requires additional reviews and procedures that can increase the time and cost required for project implementation.

6.3.2 State Funding

ALDOT may sometimes fund projects to expedite completion or if there is a general lack of federal funding. Typically these are smaller projects such as resurfacing, patching and striping, or initial phases of larger projects for which no federal funding is available.

6.3.3 Local Funding

There are several funding mechanisms that are or could be applicable to the City of Madison:

- General Fund – The general fund is taken from revenues collected by the City.
- Local Bonds – Local bond initiatives enable local governments to finance public projects by borrowing from investors, usually (but not always) within their own jurisdictions.
- Special Local Option Sales Tax (SPLOST) – A SPLOST is an optional sales tax (usually a one-cent or one-half-cent tax) used to fund capital projects proposed by a county or municipal government. The City of Madison currently collects a one-half-cent sales tax, one-quarter of which is used to fund maintenance of neighborhood roads.

6.3.4 Other Sources

Two other potential sources are:

- Development Contributions – Particularly with large-scale developments, a city may negotiate with developers to provide transportation improvements associated with the impacts of their development. Sidewalks, traffic signals, and intersection improvements are typical. More significant improvements, such as new connector roadways or interchanges, are rare yet also possible.
- Non-Profit Agencies – Several non-profit agencies offer grants for bicycle and/or multi-use trails. The most notable local agencies are The Land Trust of Northern Alabama and PeopleForBikes.

Appendix A

Travel Demand Modeling and Intersection Analysis

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APPENDIX A: TRAVEL DEMAND MODELING AND INTERSECTION ANALYSIS

The purpose of this technical appendix is to fully document the two primary technical analyses undertaken in development of the City of Madison 2040 Transportation Master Plan (2040-TP). Travel demand modeling was the basis for a city-wide assessment of traffic volumes, roadways conditions, and travel patterns, both currently occurring and projected to occur through year 2040. At a more localized level, current traffic counts and projected 2025 traffic volumes from the travel demand model were used to analyze intersection operations and assess needs at key locations throughout the city. Together, the travel demand modeling and intersection analysis results provided the technical foundation for the corridor assessments conducted to quantitatively and qualitatively evaluate corridor level deficiencies and improvements.

Travel Demand Modeling

Introduction

Travel demand modeling is a process in which existing and projected socioeconomic (SE) data are used to forecast traffic for a given base year and projected conditions. The SE data utilized in the travel demand modeling process includes household, employment, and school enrollment numbers. The SE data is aggregated to traffic analysis zones (TAZs) – essentially neighborhoods surrounded by community streets. The use of TAZs versus individual households and businesses allows for ease in data collection and reduction in operation time. In a three-step process, the SE data are converted to numbers of trips, which are then distributed throughout the roadway network, and finally assigned to particular roadways based on which routings make the most sense to actual travel patterns.

Development of the Madison 2040-TP utilized the Huntsville Area Metropolitan Planning Organization (MPO) regional travel demand model. The same TAZ boundaries were used as when the MPO develops its travel demand forecasts for the entire Huntsville region. Of the 502 TAZs within the Huntsville MPO travel demand model, 49 TAZs are fully or partially within the City of Madison. Figure A-1 shows the TAZ structure for the Madison 2040-TP and its relation to the Madison City limits.

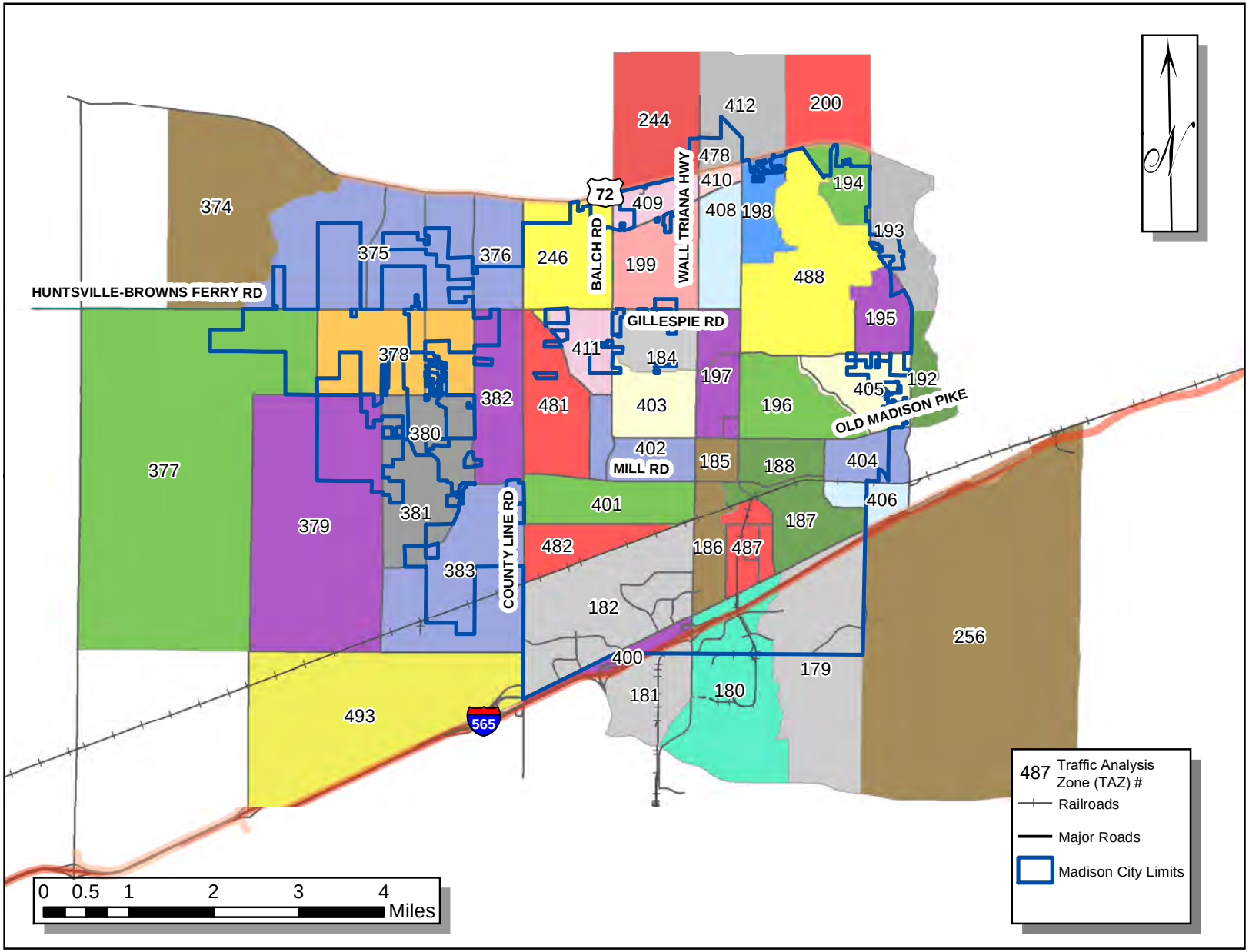
Modeling Data Revisions by the City of Madison

Several model adjustments were required to accurately forecast current and projected travel demand within the City of Madison. First, the SE data for the City of Madison was revised to reflect input provided by City staff. This exercise was undertaken to update the base year population and employment totals in the Huntsville MPO regional model, which had originally been developed with 2009 data.

To develop accurate citywide household, employment, and school enrollment estimates for use in the travel demand modeling process, City staff completed a comprehensive parcel-by-parcel inventory that included all zoning/land use types. This inventory was conducted for all properties within the boundaries of the 49 TAZs that comprised the Madison 2040-TP study area, which includes all of the City of Madison plus portions of Huntsville.

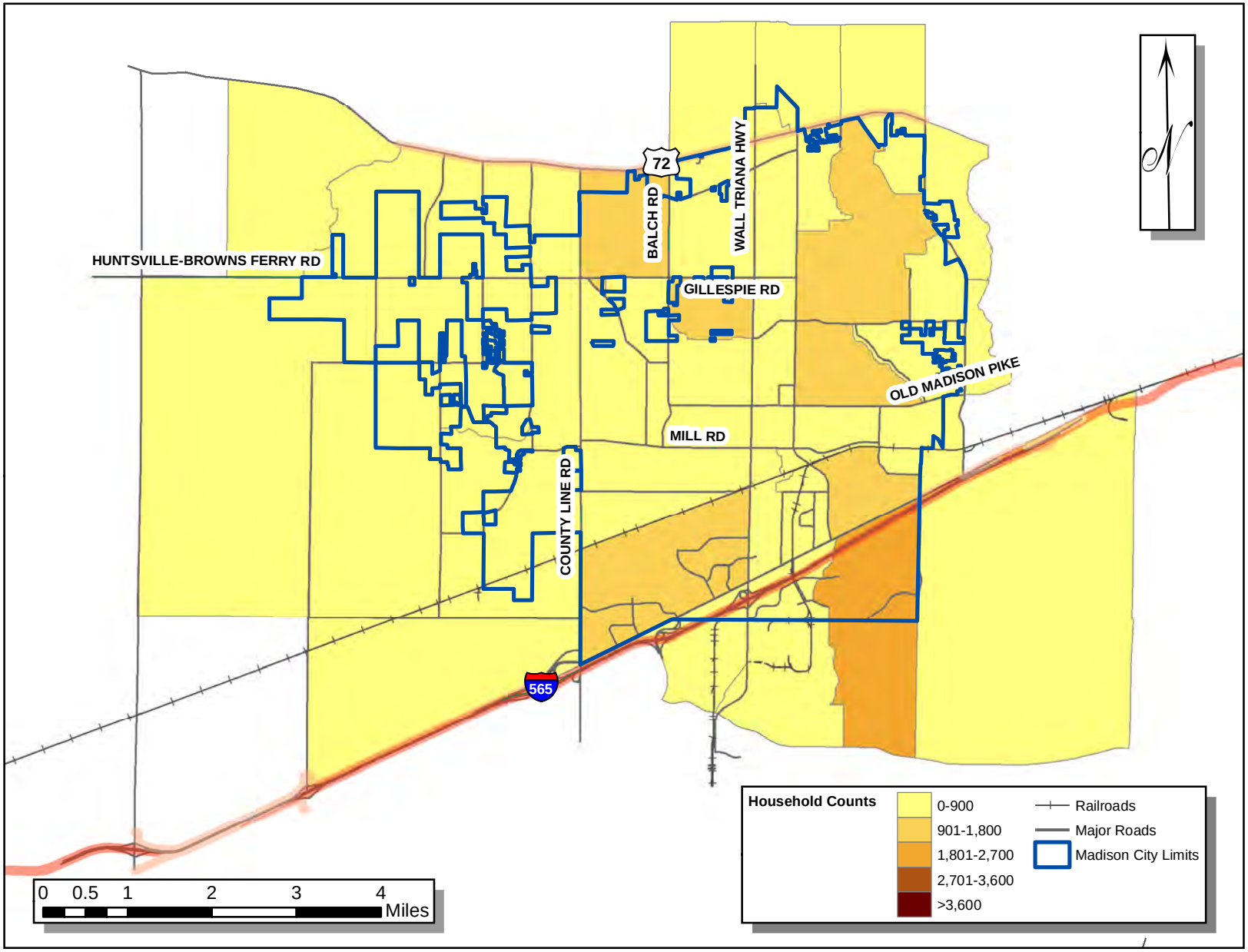
The baseline (2010) population and employment data from the Huntsville MPO are provided on Figures A-2 and A-3.

Figure A-1: TAZ Structure within the City of Madison



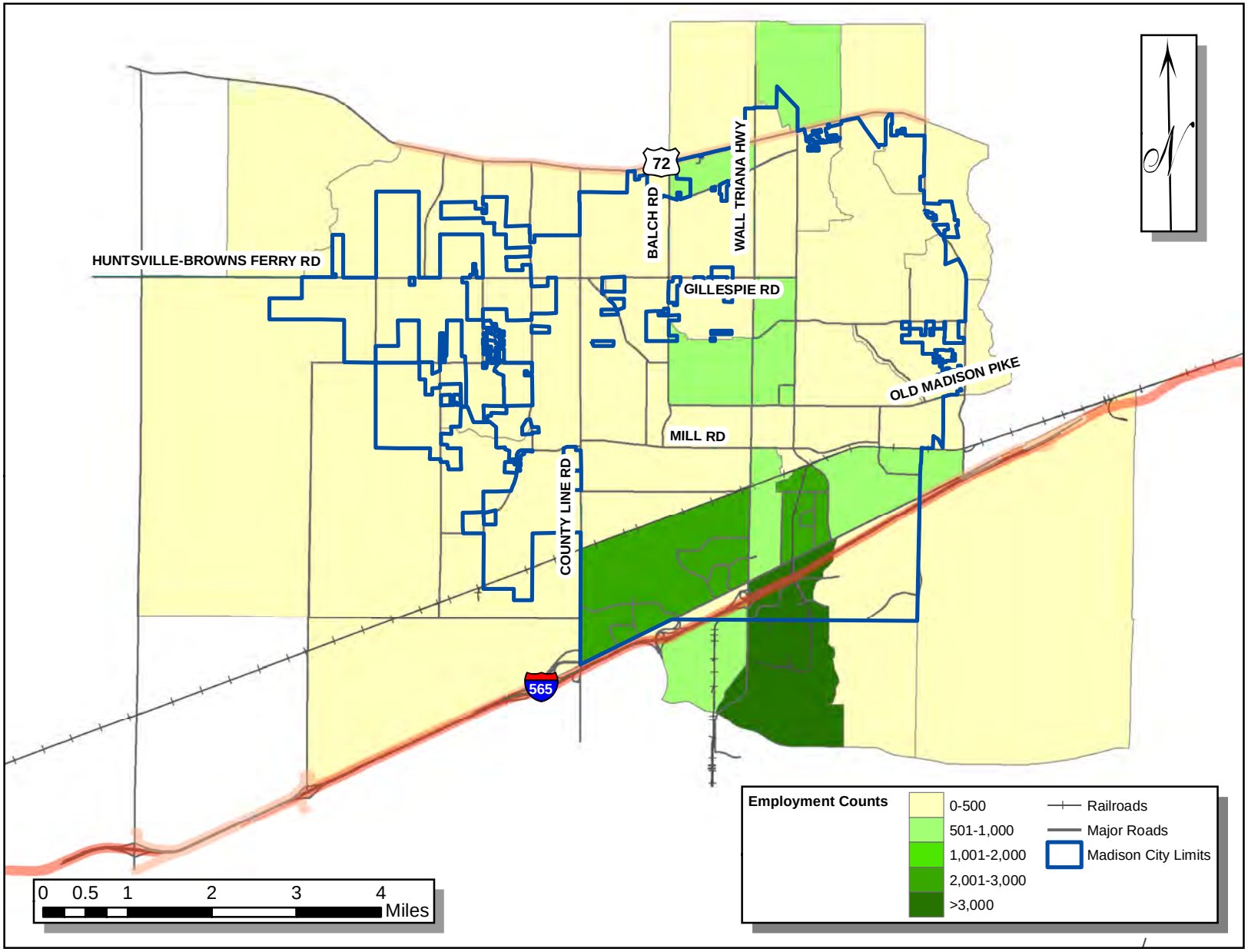
*Data Source: City of Huntsville (Huntsville MPO) GIS, 2017

Figure A-2: Base Year (2010) Household Distribution by TAZ



*Data Source: City of Huntsville (Huntsville MPO) GIS, 2017

Figure A-3: Base Year (2010) Employment Distribution by TAZ



*Data Source: City of Huntsville (Huntsville MPO) GIS, 2017

The tools and references used to conduct the inventory included:

- City of Madison and City of Huntsville GIS mapping
- Madison County and Limestone County Tax Assessor's Offices
- Google Earth
- Huntsville MPO Transportation Plan
- U.S. Census data and mapping
- Madison City School District mapping and bussing data
- Institute of Transportation Engineers (ITE) trip generation standards

Once all tabulations were completed for the 2017 SE data estimates, projections were made for the years 2025 and 2040 based on:

- Issued permits without development having occurred
- Approved projects
- Planned development applications in progress
- Opportunity or likelihood of development of vacant acreage

Assumptions for future development of vacant land were based on existing zoning and master plans and included an allowance of at least 20 percent of land area for roads and drainage. Existing wetlands, floodways and other impediments to development were considered in assessing the likelihood and amount of development occurring on existing vacant land.

The following subsections detail the methodology for adjustments to households, employment, school enrollment, and income.

Household Adjustments

Households were calculated on a per-unit basis and did not take occupancy into account. Vacant lots were not calculated in the 2017 results. However, if permits were issued or building is anticipated to be complete by 2025, the lots were included in that total. Single-family and multi-family units were combined into a single residential unit total for each TAZ.

Employment Adjustments

Employment totals are typically broken down into retail and non-retail because they have different trip generation characteristics. Retail and non-retail employment totals were computed by dividing the square footage of buildings by a typical employee-per-square-foot factor based on type of use. The square footage was obtained through a search of the Madison County and Limestone County Tax Assessor's Offices. Properties that did not have a noted square footage in the Assessor database were measured using aerial photography in GIS mapping software. Vacant commercial and industrial buildings and acreage were removed from the baseline (2017) calculations.

After the square footages were determined, a parcel-by-parcel examination of the use type was generated. Retail properties included shopping centers, gas stations, restaurants, etc. Non-retail properties were identified as office, warehousing or manufacturing, and schools or churches to account for differing traffic patterns that result from each use type.

ITE employment generation information was used in estimating employment. ITE assigns a building area square footage for each employee based on land use type. Because larger square footage buildings could be misrepresented by the trip generation standards due to their size, schools and mini-storage facilities were contacted directly to obtain a full-time employee (FTE) equivalent count. For example, a mini-storage facility that has over 120,000 square feet would calculate at 154 employees using a general industrial employment factor, when in reality there are only four employees. After all the parcel counts were completed, the total number of employees for each TAZ was then compiled for a total TAZ FTE.

The revised household and employment totals developed by the City for the 2017 baseline model scenario are shown by distribution in Figures A-4 and A-5.

Other Modeling Input Revisions

Other modeling input revisions provided by the City included:

- School Enrollment Numbers – Student enrollment counts were obtained from the Madison City School District. The information provided by the District included total enrollment counts by grade at each school, as well as bus routes and number of riders per bus, number of car riders, and number of walkers to each school.
- Income – Average income was obtained from the U.S. Census Bureau through a mapping calculation on Census maps for each TAZ boundary. These data results were to be incorporated into the traffic modeling software only.
- Physical Barriers – In addition to the above calculations, the City Engineer reviewed each TAZ to identify physical barriers within each area and the directions traffic would flow. For example, a TAZ boundary divided by a waterway with no roadway bridge would split the traffic flow in two different directions.

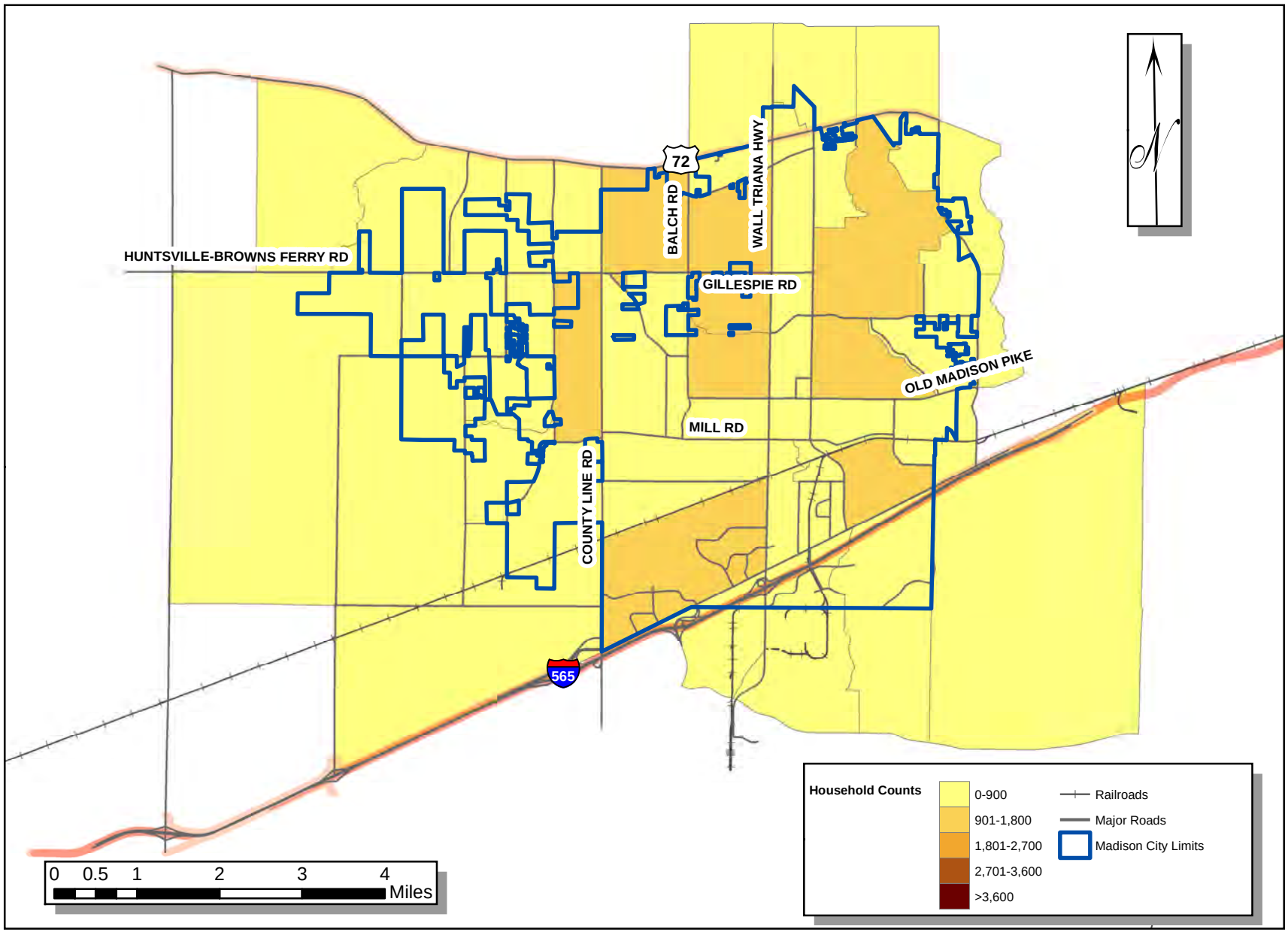
Initial Model Development

The 2017 model was developed using a combination of linear approximation of the TAZ data from the Huntsville MPO travel demand model and specific 2017 data provided by the City of Madison for the TAZs within the community. The traffic counts were entered into a GIS system based on location and the model assignment was added to the GIS system. Traffic counts that had a corresponding model assignment for the same roadway were collected and two validation statistics were collected: Root Mean Square Error (RMSE) and over percent error. These two statistical measures are tests to determine the level of accuracy of the modeling for planning purposes – which essentially is the ability to accurately determine the number of lanes required.

After the updated 2017 SE data were incorporated into the model, an initial base year model run was completed. Several issues arose that required adjustments, specifically:

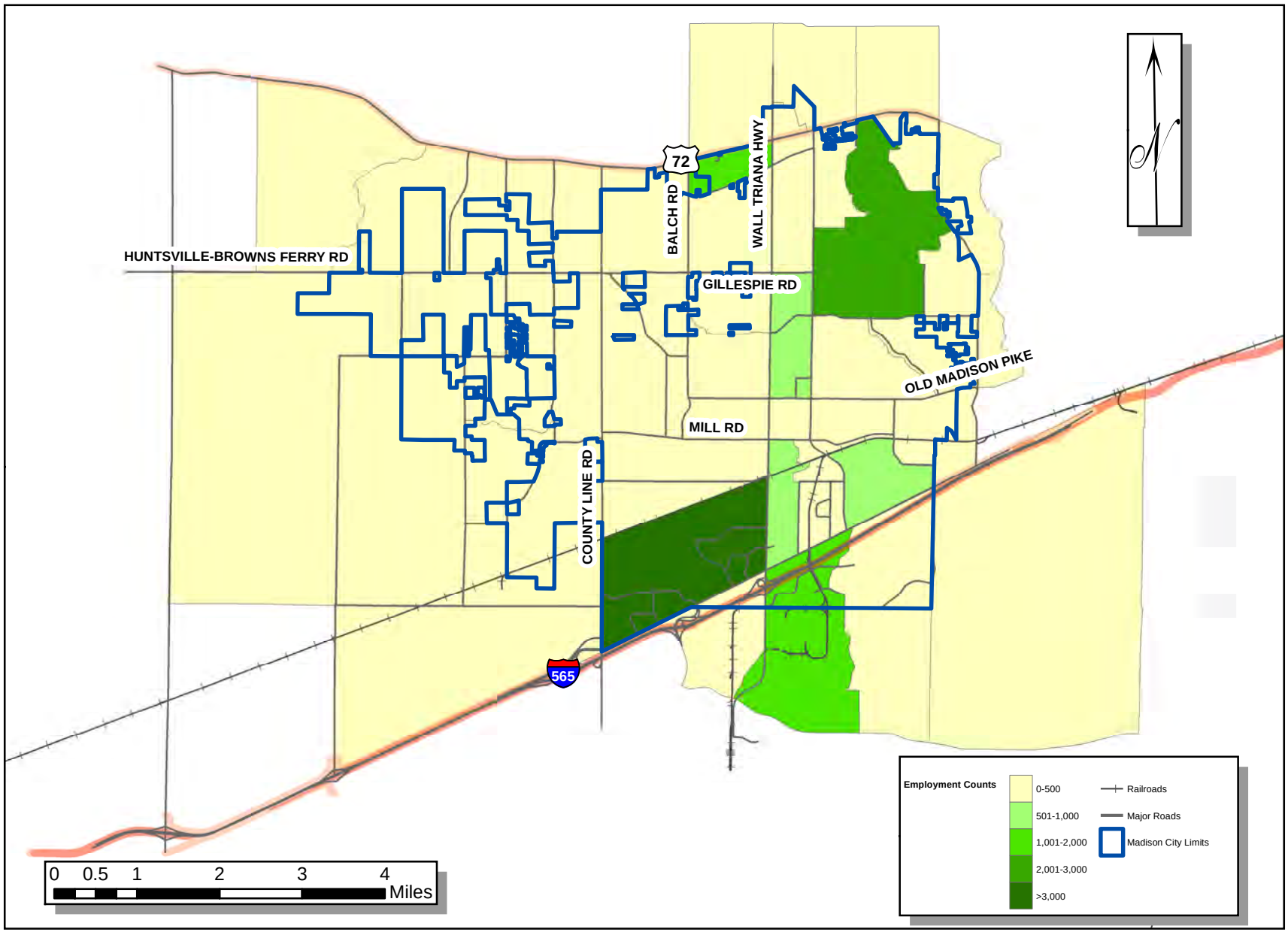
- Model volumes along several roadways varied greatly from the traffic counts taken by the City
- Overall traffic flows throughout the city were understated
- The Huntsville MPO model's baseline roadway network did not include several Madison roadways

Figure A-4: 2017 Household Distribution by TAZ



*Data Source: City of Madison, AL, GIS, 2017

Figure A-5: 2017 Employment Distribution by TAZ



*Data Source: City of Madison, AL, GIS, 2017

Iterative Model Adjustments

Based on coordination meetings with the City, the following iterative model adjustments were undertaken to correct the initial deficiencies:

- Model roadway network additions
- Trip distribution review
- Roadway capacity review
- Travel speed adjustments
- Trips per household adjustments

Model Roadway Network Additions

The model roadway infrastructure was updated to reflect comments provided by City staff. The original roadway network was sparse and lacked several roadways of key interest to the City of Madison. City staff provided a map that highlighted the roadways to be added into the model network. Figure A-6 shows the original model roadway network and the new roadways that were added to complete the roadway infrastructure.

Trip Distribution Review

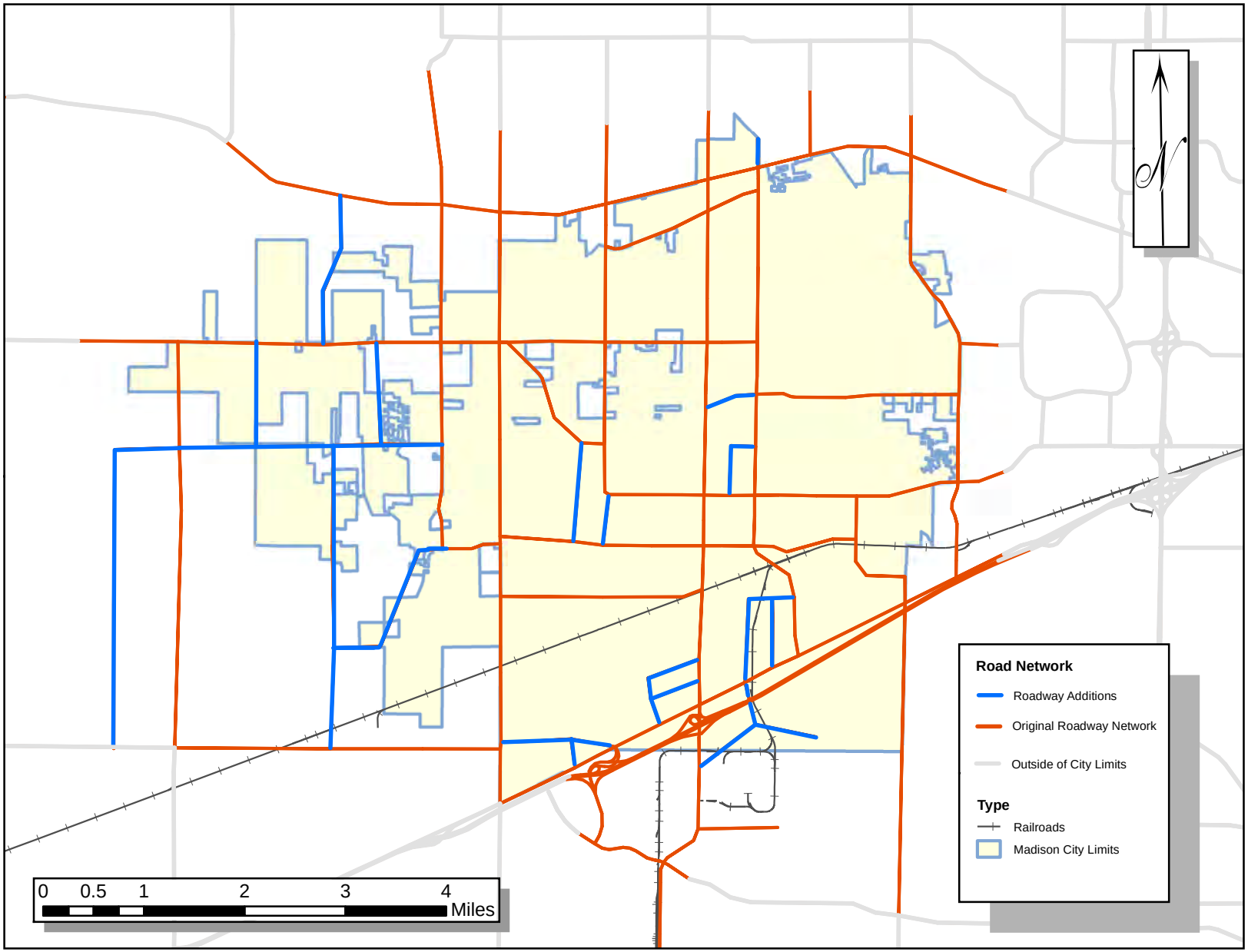
The model adjustment examined the possibility of moving/adding centroid connectors to large TAZs where there were potential trip loading issues. For example, trips that were not loading onto the correct roadways due to geographical barriers that prevented direct connectivity, such as a stream or railroad tracks. While it is not possible to tell the model exactly how many trips would use a specific connector, the location and availability of the connectors was examined to ensure that the correct options were available.

The City of Madison provided a map showing the direction of travel available from the centroids for the zones within Madison. The directionality was indicated to show potential connectivity between the roadways and the TAZs. The centroid connectors in the model were evaluated to identify connectors that were not actually drivable conditions, and these connectors were removed from the model.

Roadway Capacity Review

The capacities of the roadways in the model were updated to reflect the value deemed appropriate by City staff. The City Engineer provided a list of roadway capacities to be used, which differed from the Alabama Department of Transportation (ALDOT) capacities. The difference was based on the construction of lanes in Madison where three- and five-lane cross sections offered increases in capacity above the standard table used by ALDOT, which only considers two-lane and four-lane segments. The ability to include a left turn lane also allowed for a greater capacity to be entered on the roadways. The data provided by the City were incorporated into the model and approved by City staff. The roadways that were modified in the model included Old Madison Pike, Sullivan Street, Wall Triana Highway, Hughes Road, and Browns Ferry Road.

Figure A-6: Roadway Additions to the Base Year (2017) Model Network



*Data Source: City of Huntsville, AL JRWA, 2017

Travel Speed Adjustments

Travel speeds were adjusted to improve the traffic assignment. City staff provided peak hour travel speeds throughout the city, which altered the assignment stemming from the posted speed limits. The speeds provided represented driving speed for the roadway in the evening peak hour and included signals and stops in the value, essentially providing a corridor average travel speed in the evening peak hour. A model run assignment was conducted with the travel speeds provided by the City, and it was determined that the evening peak hour travel speeds were too low for accurate daily modeling. Therefore, it was decided that the travel speeds used in the model should fall somewhere between the posted speed limit and the congested travel speed. An alternative of the travel model was developed to incorporate these speeds. The speeds used in the model are shown in Figure A-7.

Trips per Household Adjustments

An additional adjustment to the model involved a change in trip making characteristics for the City of Madison. A review of the aggregate number of trips on the network noted a lower than expected number of trips given the income data for Madison. The trips per household calculation in the Huntsville model, which was developed based on trip characteristics from the early 1990s, indicated that households with income over $50,000 were expected to make roughly seven trips a day. This trips number is very low for the two and three-car households prevalent in the community now. To rectify this issue, trips per household from the Transportation Research Board NCHRP Report 365, Travel Estimation Techniques (1998) were used, which indicated that higher income households were likely to make in the range of 9-14 trips per household per day. Based on Report 365, an average value of 11.8 trips per household was used for the Madison TAZs, raising the total number of trips for the community to a realistic level.

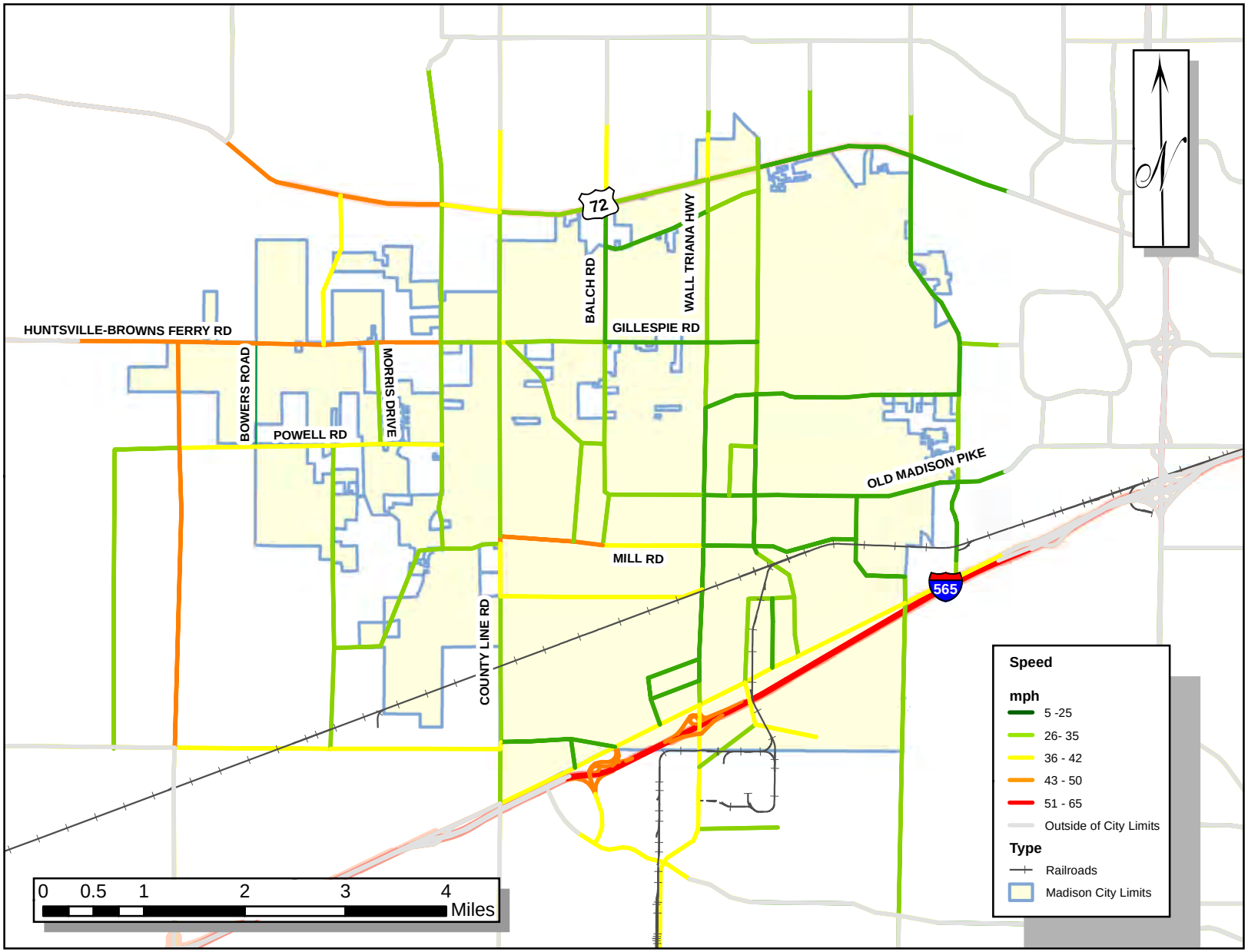
Base Year Model Results

The results for the modified base year travel demand model were validated using the guidance provided by the *Federal Highway Administration (FHWA) Manual on Calibration and Validation of Travel Models*. The validation results are as follows:

- By functional classification:
  - Minor arterials have a 13 percent difference, with a validation target of 15 percent.
  - Collector roadways have a 25 percent difference, with a validation target of 25 percent.
- By roadway volume:
  - Roadways with a volume greater than 10,000 have a 4 percent difference, with a validation target of 25 percent.
  - The overall difference for all roadways is 19 percent.

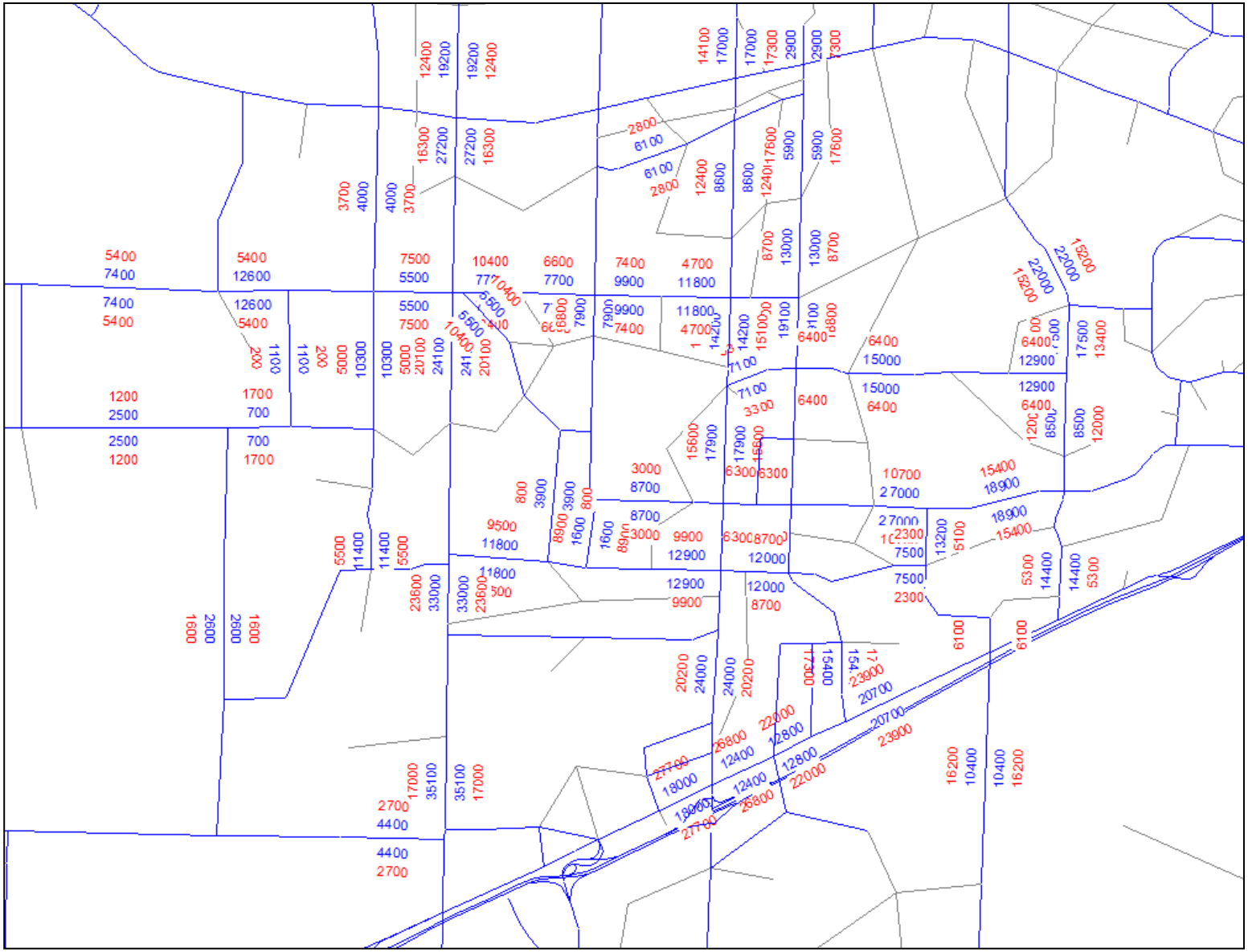
The distribution of traffic counts (red) and base year model volumes (blue) throughout the city are shown on Figure A-8.

Figure A-7: Peak Hour Travel Speeds in the Base Year (2017) Model



*Data Source: (City of Huntsville, AL) MPO, & JRWA, 2017

Figure A-8: Traffic Counts and Base Year (2017) Model Volumes



Future Year Model Results

To determine future roadway volumes:

- Future year model runs for 2025 and 2040 were developed based on the projected socioeconomic data provided by the City.
- Growth factors between the 2017 and future year model volumes were applied to the traffic counts taken by the City to determine projected volumes for 2025 and 2040.

Projected Households

Building off of the estimated households by TAZ, household projections were completed by City staff for the years 2025 and 2040 based on:

- Issued permits without development having occurred
- Approved projects
- Planned development applications in progress
- Opportunity or likelihood of development of vacant acreage

Table A-1 shows the estimated and projected population trends in the TAZs in and around the City of Madison that resulted from the analysis.

Table A-1: Existing and Projected Households in Madison Study Area TAZs

2017 Estimated Households (Baseline)	25,170
2025 Projected Households	31,310
2040 Projected Households	40,340
2017-2025 Projected Household Increase	6,040 (24%)
2025-2040 Projected Household Increase	9,030 (29%)
2017-2040 Projected Household Increase	15,070 (60%)

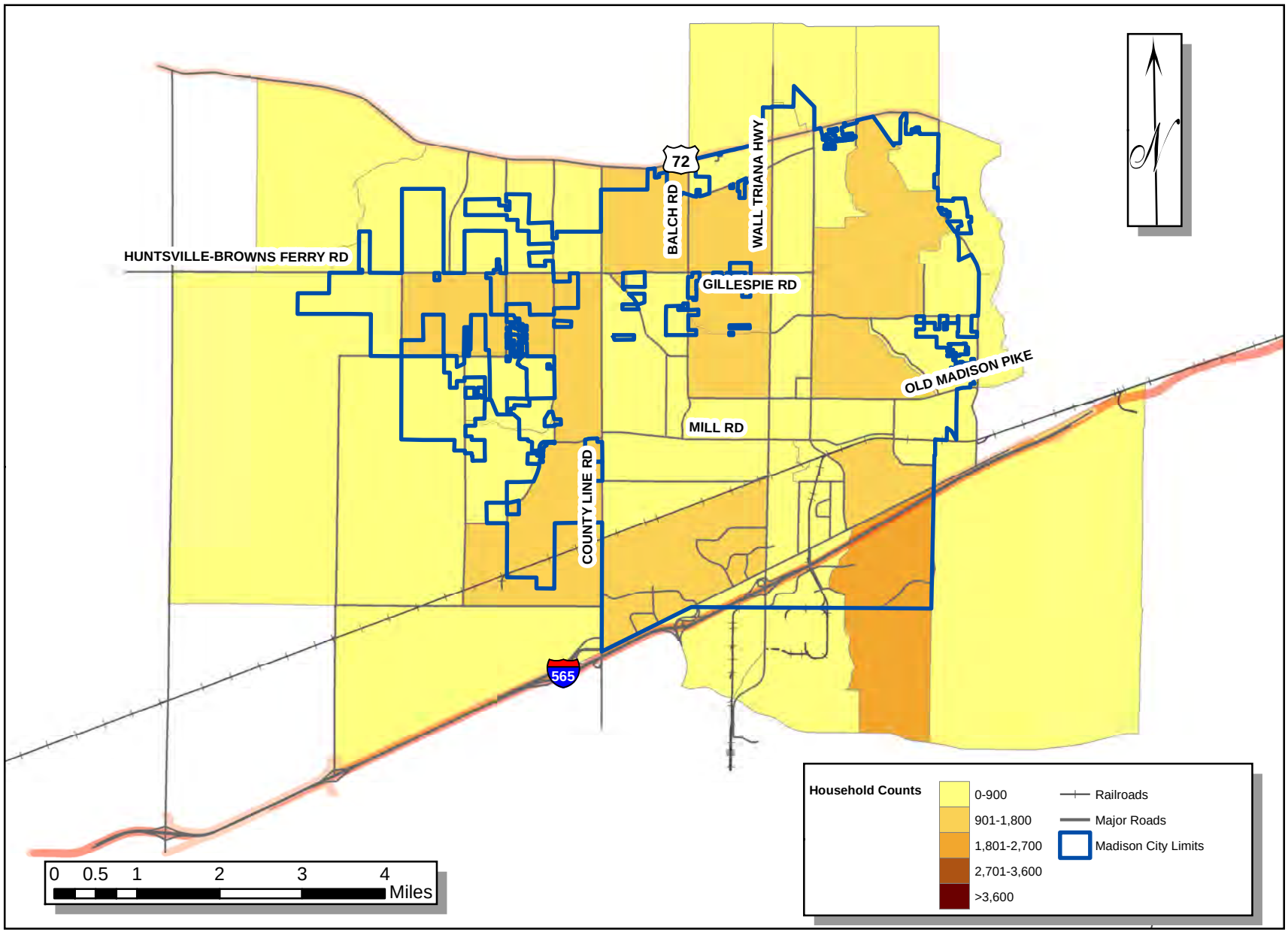
Source: City of Madison Planning and Development Staff
Note: Includes areas outside of the municipal boundaries

Residential growth for the area in and around Madison through 2040 is projected to be substantial and is expected to occur at a steady rate, as Table A-1 shows. The areas in and around Madison projected to experience the most residential growth between 2017 and 2025 include:

- West of County Line Road in Limestone County
- Along Zierdt Road south of I-565
- South of Highway 72 between Balch Road and County Line Road

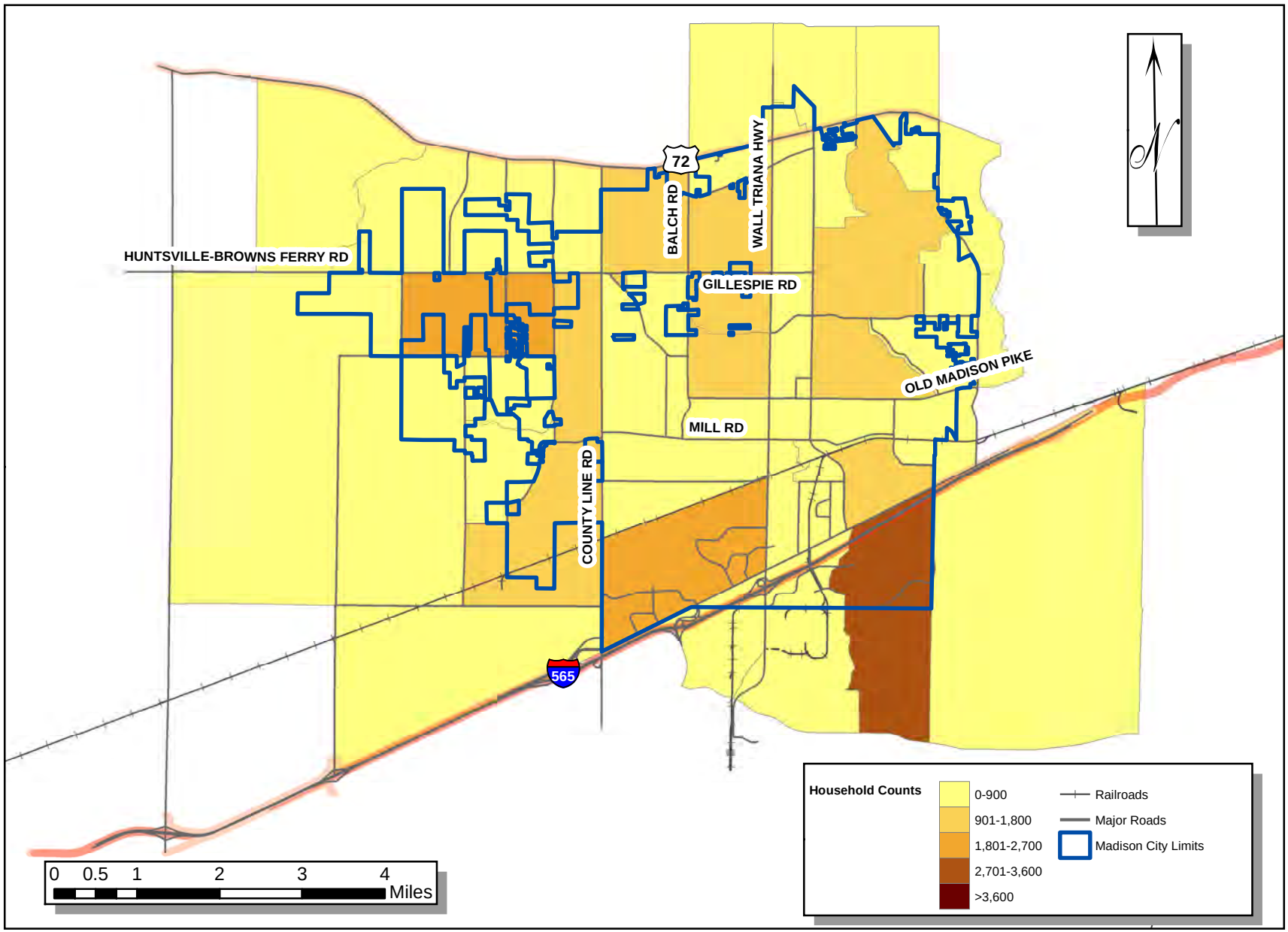
It should be noted that, due to existing build-out, many of the areas east of County Line Road are projected to experience little development increase. Growth in these areas is limited to infill development and redevelopment activities. Although most of the high growth areas listed above are outside of the Madison City limits, the development growth will impact Madison's roadways. Figures A-9 and A-10 show the distribution of households projected within the City of Madison for 2025 and 2040, respectively.

Figure A-9: 2025 Household Distribution by TAZ



*Data Source: City of Madison, AL, GIS, 2017

Figure A-10: 2040 Household Distribution by TAZ



*Data Source: City of Madison, AL, GIS, 2017

Projected Employment

Table A-2 presents the estimated and projected employment trends in the TAZs in and around the City of Madison. It should be noted that much of the employment increase is due to activity occurring outside of the Madison City limits. Several TAZs include active business development areas within the City of Huntsville, particularly near Huntsville International Airport and Redstone Gateway.

Table A-2: Existing and Projected Employment in Madison Study Area TAZs[1]

2017 Employment Estimate	34,640
2025 Employment Projection	45,860
2040 Employment Projection	67,130
2017-2025 Projected Increase	11,220 (40%)
2025-2040 Projected Increase	21,270 (46%)
2017-2040 Projected Increase	32,490 (94%)

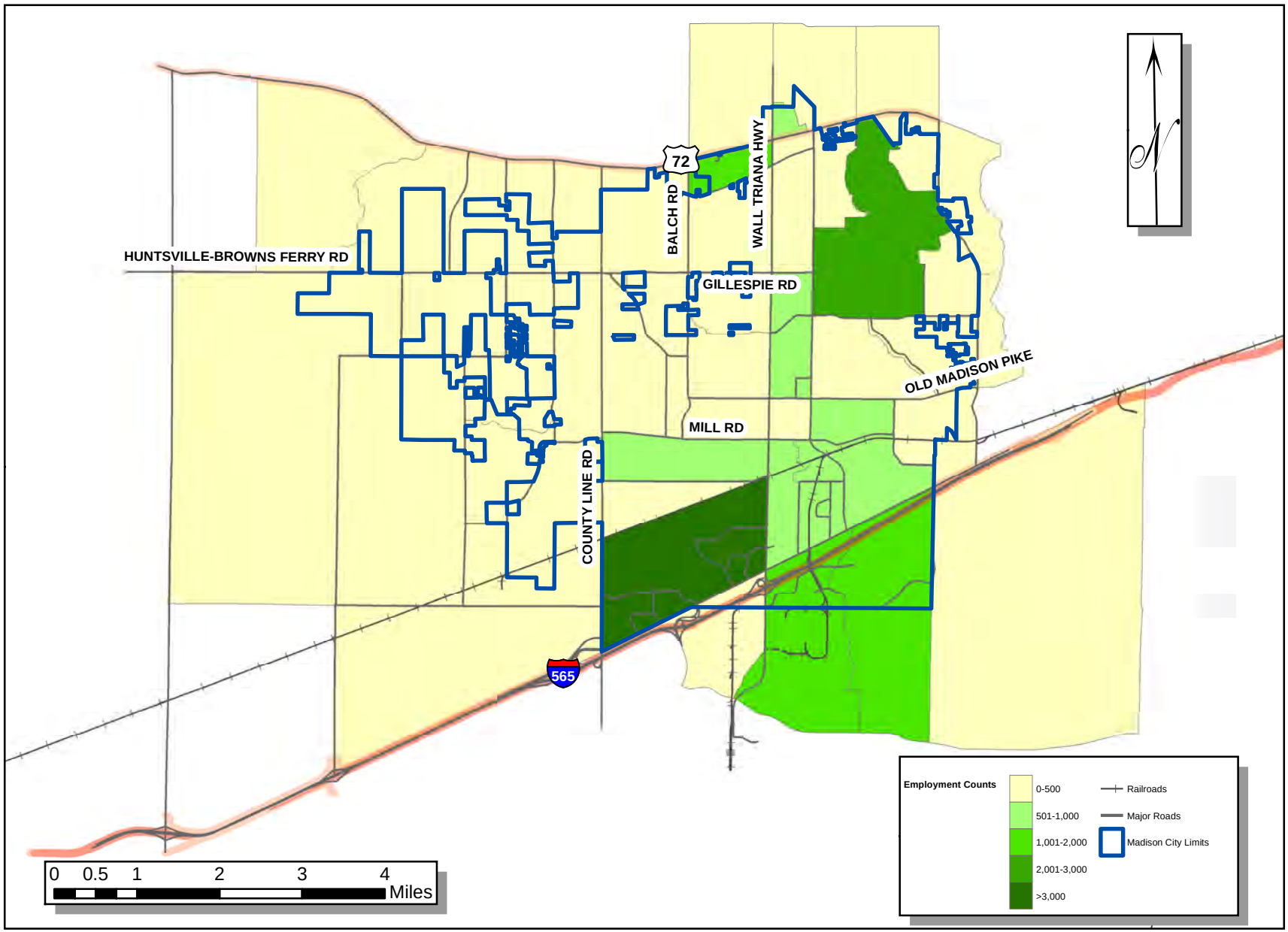
Source: City of Madison Planning and Development Staff
Note: Includes areas outside of the Madison municipal boundaries

The areas in and around Madison projected to experience the most growth in jobs between 2017 and 2025 include:

- South of I-565 between Wall Triana Highway and Zierdt Road
- East of the city on Redstone Arsenal, at the Redstone Arsenal Gateway south of I-565

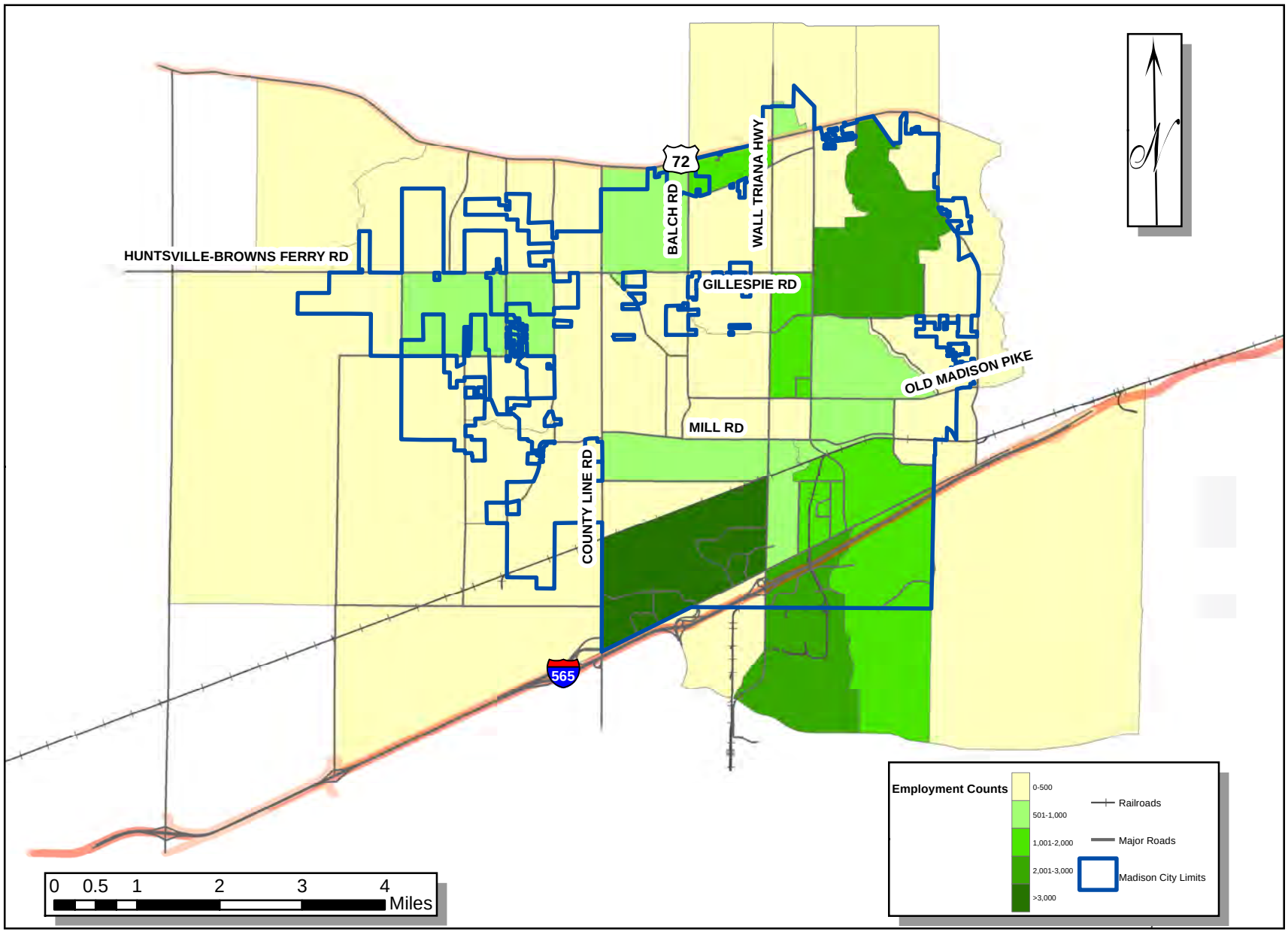
From 2025 to 2040, the areas projected to experience significant increases in employment are those listed above, as well as areas between Highway 72 and Huntsville-Browns Ferry Road west of County Line Road. As with growth to 2025, most of the areas projected for employment growth through 2040 are outside the Madison City limits. Figures A-11 and A-12 show the distribution of employment projected within the City of Madison for 2025 and 2040, respectively.

Figure A-11: 2025 Employment Distribution by TAZ



*Data Source: City of Madison, AL, GIS, 2017

Figure A-12: 2040 Employment Distribution by TAZ



*Data Source: City of Madison, AL, GIS, 2017

Projected Roadway Volumes

In order to develop a reasonable and accurate forecast of future roadway conditions, it is necessary that the travel demand model include planned roadway improvements that will affect capacity, connectivity, and/or operations along key roadways throughout the city. Table A-3 lists the projects assumed for both the 2025 and 2040 model runs.

Table A-3: Improvements Assumed within the 2025 and 2040 Model Runs

Project Type	Project Description	Construction Year* (LRTP)	2025 E+C	2040 E+C	Latest Comments from Project Sponsors (Huntsville MPO and/or ALDOT)
Capacity	Widen Highway 72 from 4 to 6 lanes from County Line Road to Providence Main Boulevard	2016	X	X	Project delayed; construction year 2019 (MPO)
Capacity	Widen Slaughter Road from 2 to 4 lanes from Old Madison Pike to US Alternate 72	2023		X	Pushed back to 2028 (MPO)
Capacity	Widen Slaughter Road from 2 to 4 lanes from Highway 72 to Old Madison Pike	2036		X	Moved up to 2034 (MPO)
Capacity	Widen Zierdt Road from 2 to 4 lanes from US Alternate 72 to Martin Road	2015	X	X	Nearly complete
Capacity	Widen Old Highway 20 from 2 to 4 lanes from County Line Road to Segers Road	2016	X	X	Design underway; City anticipates project online by 2025 (City of Huntsville)
Capacity	Widen Old Highway 20 from 2 to 4 lanes from Segers Road to Greenbrier Road	2022	X	X	Design underway; City anticipates project online by 2025 (City of Huntsville)
New Roadway	Greenbrier Parkway as 4-lane roadway from I-565 to Old Highway 20	2016	X	X	Design underway; City anticipates project online by 2025 (City of Huntsville)
New Roadway	Greenbrier Parkway as 4-lane roadway from Old Highway 20 to 5000' north of Old Highway 20	2016	X	X	Design underway; City anticipates project online by 2025 (City of Huntsville)
New Roadway	Greenbrier Parkway as 4-lane roadway from 5000' north of Old Highway 20 to Huntsville-Browns Ferry Road	2020	X	X	Design underway; City anticipates project online by 2025 (City of Huntsville)
New Roadway	Greenbrier Parkway as 4-lane roadway from Huntsville-Browns Ferry Road to I-65	2016	X	X	Design underway; City anticipates project online by 2025 (City of Huntsville)

**Reflects year in 2040 Huntsville Long Range Transportation Plan (LRTP)*

Table A-4 shows the existing and projected number of trips and vehicle miles of travel. As shown:

- Overall travel throughout the City of Madison is projected to double by 2040.
- The bulk of travel demand growth is projected to occur by 2025.

Table A-4: Projected Number of Trips and Vehicle Miles of Travel, 2025 and 2040

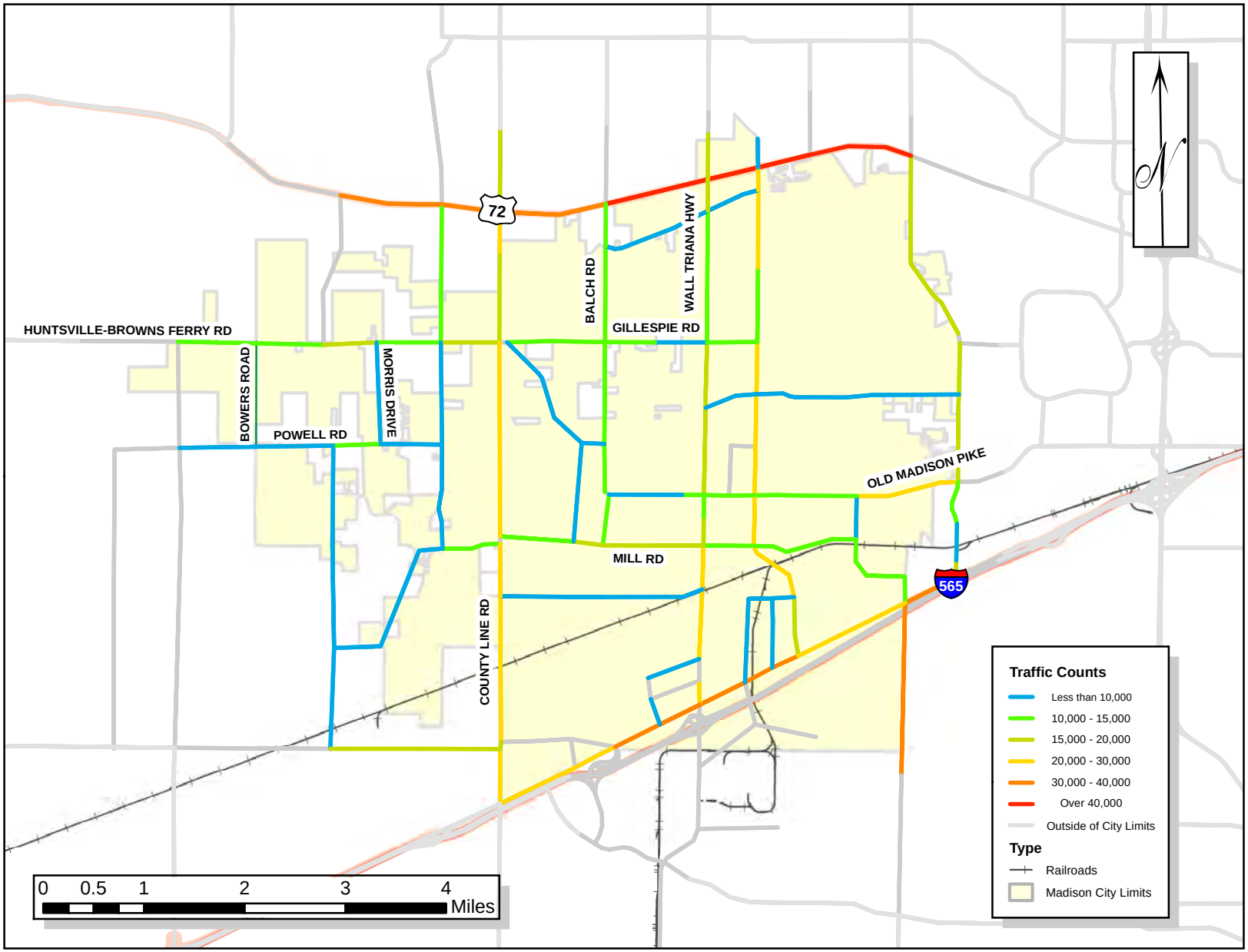
	2017	2025	2040	2017-2025 % Change	2025-2040 % Change	2017-2040 % Change
Total Trips	516,158	942,109	1,025,620	82.5%	8.9%	98.7%
Total Vehicle Miles of Travel	1,909,001	3,425,350	3,729,117	79.4%	8.9%	95.3%

Source: City of Madison 2040-TP Travel Demand Model

The projected roadway volumes for 2025 and 2040 are shown in Figures A-13 and A-14, respectively. Major trends throughout the city include:

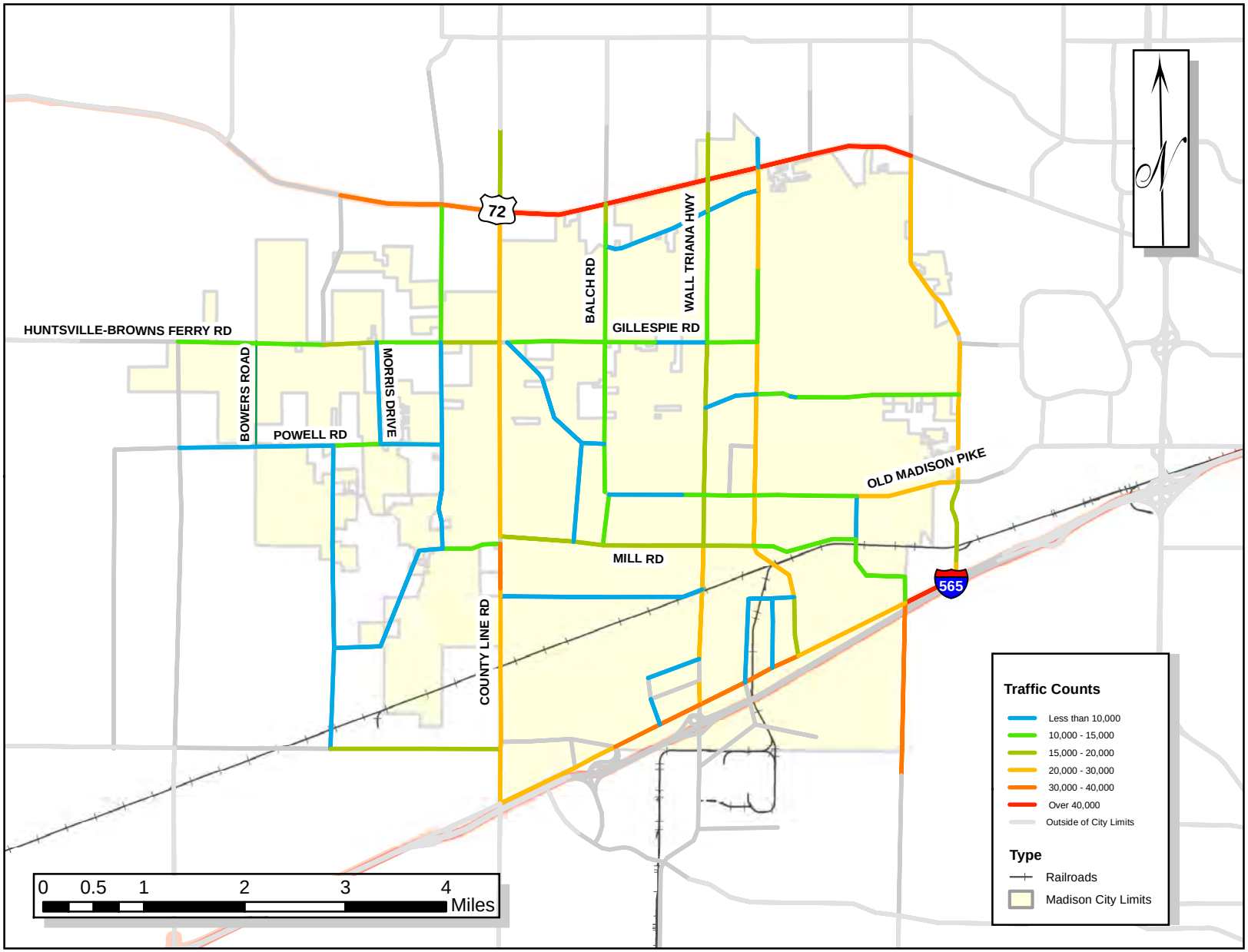
- Highway 72 and Madison Boulevard will continue to serve the most east-west traffic. However, east-west traffic is also projected to result in significant volumes along Old Madison Pike, Huntsville-Browns Ferry Road, Gillespie Road, and Mill Road by 2025.
- The fairly even distribution of traffic along the city's major north-south corridors—County Line Road, Sullivan Street/Wall Triana Highway, Hughes Road and Slaughter Road—is expected to continue through 2040.
- South of Madison Boulevard, volumes along Zierdt Road are expected to more than double with the development of Town Madison and growth at Redstone Arsenal.

Figure A-13: 2025 Projected Roadway Volumes



*Data Source: JRWA, 2018

Figure A-14: 2040 Projected Roadway Volumes



*Data Source: JRWA, 2018

Intersection Analysis

One shortfall of measuring congestion by daily volumes and volume-to-capacity (V/C) ratio is that peak hour deficiencies and localized operational improvements are often not accurately reflected. Depending on the nature and location of deficiencies, intersection improvements can offer lower cost and/or more quickly implemented alternatives to roadway widening projects.

To identify potential near term improvements to mitigate existing and projected operational deficiencies, an assessment of needs at key intersections throughout the city was conducted. The City Engineer provided a list of 14 critical intersections to be analyzed. Each critical intersection represents a choke point that reduces overall arterial flow.

Methodology

The intersection analysis was based on peak hour traffic conditions and current/future turn movements derived from the 2017 traffic counts and travel demand model growth predictions for 2025. The intersection analysis was a two-step process, as follows:

1. Critical turning movement volumes at the intersections were determined by supplementing current link volumes with peak hour turning movement counts provided by the City of Madison. The turning movement counts were compared to daily volumes to determine the directional distribution of traffic by approach, as well as the percentage of daily traffic occurring during the peak hours. The counts were broken down into left turns, right turns, and through movements by each intersection approach.
2. Future peak hour turning movement counts for each intersection were estimated by applying observed directional distributions, peak hour-to-daily volume ratios, and left/right/through breakdowns to the 2025 projected daily traffic volumes. It is important to note that this type of analysis is only useful for analyzing data trends and pointing out potential critical turning movements at each intersection. It does not serve as a basis for specific intersection design, as current trip making trends may deviate from those observed in the future.

Improvement Thresholds

Thresholds were established to identify potential turn lane additions, as follows:

- Right turn lane addition:
  - > 100 vehicles per hour during peak period
- Left turn lane addition:
  - Any left turns on an arterial at a signalized intersection justify one left turn lane
  - > 400 vehicles per hour during peak period justify a dual left turn lane
  - > 800 vehicles per hour justify a triple left turn

For planning purposes, the total intersection capacity (sum of both the major and minor intersecting roadways) for potential roundabouts are as follows:

- Approximately 15,000 vehicles per day for a mini-roundabout
- Approximately 25,000 vehicles per day for a single-lane roundabout
- Approximately 45,000 vehicles per day for a multi-lane roundabout

The thresholds used to identify the need for additional through lanes were:

- Average daily volumes surpassing approximately 12,000 suggest widening from a two-lane cross section to either a four-lane divided or five-lane roadway
- Average daily volumes surpassing approximately 35,000 suggest widening from a four- or five-lane cross section to a six-lane divided roadway.
- Greater than 800 vehicles per hour per through lane during the peak period likewise suggests the need for additional through lanes.

Analysis Results

The results of the analysis are summarized by intersection below. Current and future traffic volumes indicated that capacity improvements are already justified at many of the intersections, and that projected growth will exacerbate operational deficiencies. Before moving forward with specific improvements, the City should collect accurate count data for use in the design process.

- **Intersection #1: Balch Road at Gillespie Road –** This intersection is currently under design to be reconstructed as a single lane roundabout, with funding allocated and approved for its construction. Current and projected traffic volumes suggest that this improvement will adequately handle traffic demands through at least 2025.
- **Intersection #2: Madison Boulevard at Zierdt Road/Shelton Road –** Improvements currently designed at the intersection in conjunction with the Zierdt Road widening and the new interchange at I-565 will aid traffic operations. However, future volumes strongly suggest the need for additional travel lanes in the eastbound and westbound directions on Madison Boulevard.
- **Intersection #3: Hughes Road at Eastview Drive –** Suggested improvements include widening this segment of Hughes Road to five lanes, as recommended in the corridor assessment. A northbound right turn lane on Hughes Road would provide benefit in the short term and is currently justified.
- **Intersection #4: Hughes Road at Old Madison Pike –** Suggested improvements include the widening of Hughes Road north of Old Madison Pike, as recommended in the corridor assessment. By 2025, dual left turn lanes on Hughes Road in both the northbound and southbound directions will be desirable. This would have to be accompanied by the widening of Old Madison Pike immediately east of the intersection for at least a short distance to absorb the dual left turns.
- **Intersection #5: Highway 72 at Wall Triana Highway –** Highway 72 through lane widening is already programmed and under design, although the project status and timing is somewhat uncertain at this time. An eastbound right turn lane could be added now, while the project is in design and before major construction begins. Additionally, eastbound left turns on Highway 72 exceed the storage capacity of the current left turn lane and interfere with eastbound through traffic during typical peak hours. A dual left turn lane is recommended to ease this operational and safety issue.

- **Intersection #6: Wall Triana Highway at Gillespie Road –** Future conditions indicate this location is a good candidate for a roundabout. An additional through lane is also needed by 2025.
- **Intersection #7: Wall Triana Highway at Eastview Drive –** Future conditions indicate this location is a good candidate for a roundabout.
- **Intersection #8: Sullivan Street at Browns Ferry Road –** Future conditions indicate this location is a good candidate for a roundabout. A northbound right turn lane is also needed by 2025.
- **Intersection #9: Sullivan Street at Mill Road –** An eastbound right turn lane from Mill Road onto Sullivan Street is needed by 2025. In addition, a northbound right turn lane from Sullivan Street to Mill Road is also recommended.
- **Intersection #10: Sullivan Street at Palmer Road –** This intersection's close proximity to the Norfolk Southern railroad tracks, located immediately adjacent to Palmer Road, constrains improvement options. Widening Sullivan Street through this intersection would benefit capacity and likely represents the only real improvement possibility for this location. Widening the Wall Triana/Sullivan corridor from just north of Madison Boulevard through this area towards Mill Road is recommended.
- **Intersection #11: Wall Triana Highway at Madison Boulevard –** This intersection offers no feasible possibilities for additional turn lanes and/or other "easy" improvements. Widening Madison Boulevard to a six-lane divided section will relieve congestion here, along with possible relief from the future I-565/Zierdt Road interchange.
- **Intersection #12: County Line Road at Madison Boulevard –** Heavy eastbound left turn volumes and westbound right turn volumes indicate the need for additional turning lanes, particularly by 2025. Adding another westbound right turn lane to provide for dual right turns would be a relatively affordable and easily implemented project to improve operations at this intersection. It would be desirable to accompany this improvement with an additional third northbound through lane on County Line Road in the vicinity of the intersection to provide a "free-flow" turn lane through the intersection.
- **Intersection #13: County Line Road at Arbor Trace/Mill Road –** A northbound right turn lane is suggested by 2025. The projected volumes of approximately 15,000 on Mill Road east of County Line Road indicate that this segment will require some form of capacity improvement, to either a five-lane section or an improved three-lane section. If the segment is widened to five lanes, a southbound dual left turn lane on County Line Road should be provided with the widening improvement.
- **Intersection #14: County Line Road at Gillespie Road –** Future projections indicate that southbound and eastbound right turn lanes will be desirable at this intersection by 2025.

Appendix B-1

Identification and Assessment of Potential Improvements

APPENDIX B-1 – IDENTIFICATION AND ASSESSMENT OF POTENTIAL IMPROVEMENTS

This appendix to the City of Madison 2040 Transportation Master Plan (2040-TP) presents the universe of potential improvements that were identified and evaluated for possible inclusion in the 2040-TP recommendations.

Potential projects were categorized based on the type of improvement for consideration:

- **Capacity** – Additional through lanes and/or new roadways
- **Operations** – Intersection signalization, configuration, and/or turn lanes (including center turn lanes)
- **Bicycle/Pedestrian** – Share the Road signage/markings, multi-use trails, sidewalks, and/or pedestrian signals
- **Transit** – New transit service
- **Access Management** – Turn restrictions, medians, shared access, and/or driveway management
- **Complete Streets** – Bicycle/pedestrian enhancements, transit services, and/or landscaping to promote multimodal travel

Identification of Potential Improvements

Potential improvements were identified through two evaluation methods. First, recent planning documents prepared by the City of Madison and Huntsville Area Metropolitan Planning Organization (MPO) were reviewed to identify project recommendations applicable to the 2040-TP. Documents that were the source of projects included:

- Huntsville Are MPO 2040 Long Range Transportation Plan (LRTP)
- City of Madison West Side Master Plan
- City of Madison 2025 Transportation Master Plan
- City of Madison Growth Plan
- City of Madison Greenway and Trails Master Plan
- City of Madison Parks and Recreation Master Plan 2025

In addition, the second evaluation method included development of potential improvements that would respond to deficiencies identified during the needs assessment, but which were not yet addressed by other recommended projects. Technical analyses included travel demand modeling and corridor operational assessments. Qualitative assessments were also undertaken, particularly for bicycle and pedestrian, transit, and Complete Streets improvements.

Assessment of Potential Improvements

Potential improvements were evaluated to gauge the degree to which they responded to the identified need. Key factors considered for each type of improvement are listed below.

- **Capacity** – The primary factor for capacity projects is congestion, as indicated by the volume to capacity (V/C) ratio. V/C is derived from the traffic counts taken in 2017 and travel demand modeling projections for 2025 and 2040. Typically, as V/C ratio exceeding 1.0 reflects a need

for additional capacity. Other factors taken into consideration are the amount of traffic on the roadway and right-of-way constraints.

- **Operations** – The primary indictors of operational deficiencies were the intersection assessments based on 2017 traffic counts and 2025 projected volumes from the travel demand model. Existing and projected traffic volumes at the intersection are considered against turn movement counts to identify intersection deficiencies. The potential need for a center turn lane was primarily identified through existing and projected congestion levels. Other factors considered the number of trips served at the intersection, congestion levels along the roadway corridors, right-of-way constraints, and safety.
- **Bicycle Facilities** – The primary indicators for bicycle facilities – which could include on-street bicycle lanes or off-street multi-use paths – are bicycle suitability and connectivity. Considerations for bicycle facilities include roadway traffic volumes as well as the ability to connect to destinations supportive of travel by bicycle (such as residential areas, trails and parks, schools, retail and employment centers, and community facilities). Other factors include right-of-way constraints and overall travel demand along a specific corridor. The need for new or extensions to off-road paths/trails (such as the Bradford Creek and Mill Creek greenways) is focused on connectivity to existing facilities and recreational areas.
- **Pedestrian Facilities** – Pedestrian facilities primarily include sidewalks, crosswalks and pedestrian signalization. The primary indicator for sidewalks is pedestrian suitability and connectivity to other sidewalks and/or bicycle facilities. Pedestrian suitability considers the ability to access key destinations safely by walking. A primary difference between pedestrian and bicycle suitability is that sidewalks need to be closer to the destinations they are intended to serve.
- **Transit Routes/Corridors** – Without having existing services to gauge transit propensity and/or ridership characteristics, the primary indicators for any potential new transit services are existing and projected traffic volumes and roadway congestion levels. Other indicators for potential transit service are the presence of higher density residential and employment concentrations and connections to activity centers, retail uses, and/or community facilities.
- **Access Management** – The two primary indicators for access management strategies are safety and roadway geometrics (such as proximity of adjacent curb cuts, alignment of medians and turn lanes with respect to curb cuts, etc.). Other factors considered are congestion, intersection operations, and supportive land uses.
- **Complete Streets** – Determining the need for Complete Streets applications is based upon multiple factors, including the suitability of adding bicycle and/or pedestrian facilities within the right-of-way, the availability of right-of-way, roadway operational characteristics, and supportive land uses. Other considerations include traffic volumes, safety and connectivity to other bicycle and pedestrian facilities.

Organization

The presentation of potential improvements in Table B-1 groups the projects by corridor, with corridors denoted as east-west or north-south. The east-west corridors are ordered from north to south, while the north-south corridors are ordered from east to west. The corridor organization is:

East-West Corridors

- Highway 72
- Gooch Lane
- Huntsville-Browns Ferry Road
- Gillespie Road
- Eastview Drive
- Browns Ferry Road/Old Madison Pike
- Mill Road/Portal Lane
- Palmer Road
- Hardiman Road
- Madison Boulevard

North-South Corridors

- Slaughter Road
- Zierdt Road
- Shelton Road
- Hughes Road
- Sullivan Street/Wall Triana Highway
- Balch Road
- County Line Road
- Burgreen Road

Table B-1: Potential Improvement Projects Considered for the 2040-TP

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Comments / Assessment
Highway 72				
EW-1	Widen Highway 72 from 4 to 6 lanes from County Line Road to Providence Main Boulevard	Capacity	ALDOT Work Program	Not assessed; currently in ALDOT work program (2019). Travel demand modeling validates need.
EW-2	Widen Highway 72 from 4 to 6 lanes from Holladay Boulevard to County Line Road	Capacity	Madison 2040-TP Travel Demand Modeling	Segment of Highway 72 is outside City limits.
EW-3	Eastbound left turn lane on Highway 72 at Wall Triana Highway	Operations	Madison 2040-TP Intersection Analysis	Identified as immediate need per Intersection Analysis based on current traffic counts. Opportunity to coordinate with ALDOT and City of Huntsville to incorporate into widening project.
EW-4	Eastbound right turn lane on Highway 72 at Wall Triana Highway	Operations	Madison 2040-TP Intersection Analysis	Identified as immediate need per Intersection Analysis based on current traffic counts. Opportunity to coordinate with ALDOT and City of Huntsville to incorporate into widening project.
EW-5	Highway 72 sidewalks and pedestrian signals	Bicycle/ Pedestrian	Madison Growth Plan Madison 2040-TP Qualitative Assessment	Connectivity to key destinations or other facilities.
EW-6	Highway 72 highway enhancements	Capacity/ Operations	Madison Growth Plan	Not assessed due to change in project definition; replaced by Highway 72 widening and turn lane modifications identified in Intersection Analysis.

[1] All capacity improvements are assumed to include either a continuous center turn lane or a median with left turn lanes.

Table B-1: Potential Improvement Projects Considered for the 2040-TP

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Comments / Assessment
EW-7	Highway 72 transit services	Transit	Madison 2040-TP Corridor/Qualitative Assessment	Highly traveled corridor with employment centers. Coordination needed internally and with partner agencies prior to implementation.
EW-8	Access management strategies – County Line Road to Slaughter Road	Access Management	Madison Growth Plan Madison 2040-TP Corridor Assessment	Opportunity to coordinate with ALDOT and City of Huntsville to ensure proper access management applications during widening project.
Gooch Lane				
EW-9	Gooch Lane sidewalks	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	Gaps in sidewalk to connect to Hughes Road multi-use trail can be filled through routine maintenance activities. Enhances safety to schools.
Huntsville-Browns Ferry Road				
EW-10	Widen Huntsville-Browns Ferry Road from 2 to 4 lanes from Mooresville Road to County Road Line	Capacity	Madison 2040-TP Travel Demand Modeling Huntsville MPO 2040 LRTP (Visionary) West Side Master Plan	2025 projected V/C levels reflect need; however, other near term roadway improvements may improve conditions to acceptable levels of service. To be re-evaluated during next Plan update. Project limits amended to Bowers Road to reflect City boundaries.
EW-11	Huntsville-Browns Ferry Road bike lanes – Burgreen Road to County Line Road	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	Connectivity to key destinations or other facilities.
EW-12	Huntsville-Browns Ferry Road sidewalks – Burgreen Road to County Line Road	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	Connectivity to key destinations or other facilities.
EW-13	Huntsville-Browns Ferry Road "Share the Road" signage and/or pavement markings	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	Connectivity to key destinations or other facilities.
EW-14	Huntsville-Browns Ferry Road Complete Streets applications	Complete Streets	Madison 2040-TP Corridor/Qualitative Assessment	Connectivity to key destinations or other facilities.

Table B-1: Potential Improvement Projects Considered for the 2040-TP

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Comments / Assessment
Gillespie Road				
EW-15	Eastbound right turn lane on Gillespie Road at County Line Road	Operations	Madison 2040-TP Intersection Analysis	Identified need by 2025 per Intersection Analysis based on projected model volumes.
EW-16	Gillespie Road multi-use path from Balch Road to County Line Road	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025 Madison Greenway and Trails Master Plan	Connectivity to key destinations or other facilities. Enhances safety to schools.
EW-17	Gillespie Road sidewalks – Balch Road to County Line Road	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	Connectivity to key destinations or other facilities. Enhances safety to schools.
EW-18	Gillespie Road "Share the Road" signage and/or pavement markings	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	Interim strategy to promote Complete Streets environment. Low-cost strategy reinforces bicycle corridors prior to implementation of on-street facilities.
EW-19	Gillespie Road Complete Streets applications	Complete Streets	Madison 2040-TP Corridor/Qualitative Assessment	Connectivity to key destinations or other facilities.
Eastview Drive				
EW-20	Eastview Drive bicycle facilities – Highland Drive to Slaughter Road	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Madison Greenway and Trails Master Plan	Connectivity to key destinations. Right-of-way limitations restrict potential for bicycle facilities.
EW-21	Eastview Drive sidewalks – Highland Drive to Slaughter Road	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	Connectivity to key destinations or other facilities. Enhances safety to schools.
EW-22	Eastview Drive "Share the Road" signage and/or pavement markings	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	Low-cost strategy reinforces bicycle corridors prior to/after implementation of on-street facilities.
Browns Ferry Road/Old Madison Pike				

Table B-1: Potential Improvement Projects Considered for the 2040-TP

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Comments / Assessment
EW-23	Widen Old Madison Pike from 3 to 4 lanes from Hughes Road to Slaughter Road	Capacity	Madison 2040-TP Travel Demand Modeling Huntsville MPO 2040 LRTP (Visionary)	2025 projected V/C levels reflect need; however, other near term roadway improvements may improve conditions to acceptable levels of service. To be re-evaluated during next Plan update.
EW-24	Widen Browns Ferry Road from 3 to 5 lanes from Hughes Road to Sullivan Street/Wall Triana Highway	Capacity	Identified by City Staff	Widening from Hughes Road to Plaza Drive already underway. Needed to support retail development.
EW-25	Old Madison Pike roadway enhancements	Capacity/ Operations	Madison Growth Plan	Not evaluated; project redefined into more detailed capacity and operations improvements for evaluation.
EW-26	Browns Ferry Road sidewalks – Balch Road to Park Meadow	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Madison Greenway and Trails Master Plan	Project limits redefined to reflect current needs.
EW-27	Old Madison Pike bicycle facilities	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	Connectivity to key destinations or other facilities.
EW-28	Browns Ferry Road "Share the Road" signage and/or pavement markings from Balch Road to Gillespie Road	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	High bicycle suitability. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.
EW-29	Old Madison Pike "Share the Road" signage and/or pavement markings from Hughes Road to Slaughter Road	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	High bicycle suitability. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.
EW-30	Browns Ferry Road Complete Streets applications	Complete Streets	Madison 2040-TP Corridor/Qualitative Assessment	Connectivity to key destinations or other facilities.
EW-31	Old Madison Pike Complete Streets applications	Complete Streets	Madison 2040-TP Qualitative Assessment	Connectivity to key destinations or other facilities.
Mill Road/Portal Lane				

Table B-1: Potential Improvement Projects Considered for the 2040-TP

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Comments / Assessment
EW-32	Widen Mill Road from 2 to 4 lanes from County Line Road to Hughes Road	Capacity	Madison 2040-TP Travel Demand Modeling Huntsville MPO 2040 LRTP (Visionary)	2025 projected V/C levels reflect need; however, other near term improvements and project EW-35 may improve conditions to acceptable levels of service. To be re-evaluated during next Plan update.
EW-33	Extend Portal Lane as a 2-lane road from Shelton Road to Zierdt Road Extension	Capacity	Huntsville MPO 2040 LRTP (Visionary) Madison 2025 Transportation Master Plan	Not assessed; Zierdt Road Extension not justified.
EW-34	Eastbound right turn lane on Mill Road at Sullivan Street	Operations	Madison 2040-TP Intersection Analysis	Identified as immediate need per Intersection Analysis based on current traffic counts.
EW-35	Center turn lane on Mill Road from Hughes Road to County Line Road	Operations	Madison 2040-TP Travel Demand Modeling	2025 projected V/C levels reflect need; however, other near term improvements may improve conditions to acceptable levels of service. To be re-evaluated during next Plan update.
EW-36	Realignment of Mill Road/Hardiman Road intersections at County Line Road	Operations	Madison Growth Plan	Project no longer necessary; new signal at Arbor Trace/Mill Road addresses turn movements and safety.
EW-37	Mill Road bicycle facilities	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025 Madison Greenway and Trails Master Plan	Connectivity to key destinations or other facilities.
EW-38	Mill Road sidewalks – County Line Road to Bradford Creek Trail	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025	Connectivity to key destinations or other facilities. Enhances safety to schools.
EW-39	Mill Road "Share the Road" signage and/or pavement markings	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.

Table B-1: Potential Improvement Projects Considered for the 2040-TP

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Comments / Assessment
EW-40	Mill Road Complete Streets applications	Complete Streets	Madison 2040-TP Corridor/Qualitative Assessment	Connectivity to key destinations or other facilities.
Palmer Road				
EW-41	Palmer Road/Front Street bicycle facilities	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025	Connectivity to key destinations or other facilities.
EW-42	Palmer Road "Share the Road" signage and/or pavement markings	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.
EW-43	Palmer Road Complete Streets applications	Complete Streets	Madison 2040-TP Corridor/Qualitative Assessment	Connectivity to key destinations or other facilities.
Hardiman Road				
EW-44	Center turn pockets and median on Hardiman Road from Burgreen Road to Segers Road	Operations	West Side Master Plan	Promotes urban context and Complete Streets design recommendations from West Side Master Plan.
EW-45	Roundabout at Hardiman Road and Burgreen Road	Operations	West Side Master Plan	Promotes urban context recommendations from West Side Master Plan.
EW-46	Hardiman Road sidewalks	Bicycle/ Pedestrian	West Side Master Plan	Promotes urban context and Complete Streets design recommendations from West Side Master Plan.
EW-47	Hardiman Road "Share the Road" signage and/or pavement markings	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment [West Side Master Plan]	Interim strategy to promote West Side Master Plan Complete Streets environment. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.
EW-48	Hardiman Road Complete Streets applications (including multi-use trail)	Complete Streets & Bicycle/ Pedestrian	Madison 2040-TP Corridor/Qualitative Assessment	Promotes urban context and Complete Streets design recommendations from West Side Master Plan.

Table B-1: Potential Improvement Projects Considered for the 2040-TP

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Comments / Assessment
Madison Boulevard				
EW-49	Widen Madison Boulevard from 4 to 6 lanes from County Line Road to east of Madison	Capacity	Madison 2040-TP Travel Demand Modeling	2025 projected V/C levels reflect need.
EW-50	Additional westbound right turn lane on Madison Boulevard at County Line Road	Operations	Madison 2040-TP Intersection Analysis	Identified as immediate need per Intersection Analysis based on current traffic counts.
EW-51	Additional westbound left turn lane on Madison Boulevard at Zierdt Road	Operations	Madison 2040-TP Intersection Analysis	Not assessed; to be completed as part of Zierdt Road widening to four lanes. Need validated through Intersection Analysis.
EW-52	Madison Boulevard transit services	Transit	Madison 2040-TP Corridor/Qualitative Assessment	Highly traveled corridor with employment and commercial development. Coordination needed internally and with partner agencies prior to implementation. No timetable identified for transit service.
EW-53	Access management strategies – Sullivan Street to Zierdt Road	Access Management	Madison 2040-TP Corridor/Qualitative Assessment	Several curb cuts, median breaks and opportunities to consolidate driveways.
Slaughter Road				
NS-1	Widen Slaughter Road from 2 to 4 lanes from Highway 72 to Old Madison Pike	Capacity	ALDOT Work Program	Not assessed; currently in ALDOT work program (2034). Travel demand modeling validates need; projected 2025 V/C ratio indicates needed prior to 2025.
NS-2	Widen Slaughter Road from 2 to 4 lanes from Old Madison Pike to Madison Boulevard	Capacity	ALDOT Work Program	Not assessed; currently in ALDOT work program (2028). Travel demand modeling validates need.
NS-3	Slaughter Road sidewalks (with widening project)	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	To be addressed through coordination with City of Huntsville during planned widening of Slaughter Road.

Table B-1: Potential Improvement Projects Considered for the 2040-TP

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Comments / Assessment
NS-4	Slaughter Road Complete Streets applications	Complete Streets	Madison 2040-TP Corridor/Qualitative Assessment	To be addressed through coordination with City of Huntsville during planned widening of Slaughter Road.
Zierdt Road				
NS-5	Widen Zierdt Road from 2 to 4 lanes from Madison Boulevard to south of Madison	Capacity	ALDOT Work Program	Not assessed; currently in ALDOT work program (2018). Travel demand modeling validates need.
NS-6	Extend Zierdt Road as a 2-lane roadway from 1 mile north of Madison Boulevard to Old Madison Pike	Capacity	Huntsville MPO 2040 LRTP (Visionary)	Not justified per projected V/C levels along parallel roadways (after Slaughter Road widening).
NS-7	Zierdt Road – pedestrian amenities to complement multi-use trail facilities	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	To be addressed through routine maintenance and upgrades and/or coordination with City of Huntsville during future construction.
Shelton Road				
NS-8	Widen Shelton Road from 2 to 4 lanes from Madison Boulevard to Old Madison Pike	Capacity	Huntsville MPO 2040 LRTP (Visionary)	Not justified per current and projected V/C levels.
NS-9	Shelton Road sidewalks	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	Serves multi-family residential development. Could be provided through routine maintenance activities.
Hughes Road				
NS-10	Widen Hughes Road from 3 to 4 lanes from Old Madison Pike to Highway 72	Capacity	Madison 2040-TP Travel Demand Modeling Huntsville MPO 2040 LRTP (Visionary)	2025 projected V/C levels reflect need.
NS-11	Northbound right turn lane on Hughes Road at Eastview Drive	Operations	Madison 2040-TP Intersection Analysis	Identified as immediate need per Intersection Analysis based on current traffic counts.
NS-12	Additional northbound left turn lane on Hughes Road at Browns Ferry Road	Operations	Madison 2040-TP Intersection Analysis	Identified as need by 2025 per Intersection Analysis based on projected model volumes.
NS-13	Additional southbound left turn lane on Hughes Road at Old Madison Pike	Operations	Madison 2040-TP Intersection Analysis	Identified as need by 2025 per Intersection Analysis based on projected model volumes.

Table B-1: Potential Improvement Projects Considered for the 2040-TP

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Comments / Assessment
NS-14	Hughes Road – pedestrian amenities to complement multi-use trail facilities	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	Address through routine maintenance and upgrades. Enhances safety to schools.
NS-15	Hughes Road transit services	Transit	Madison 2040-TP Corridor/Qualitative Assessment	Highly traveled corridor with commercial, schools, and activity centers. Coordination needed internally and with partner agencies prior to implementation.
NS-16	Access management strategies – Hughes Road at Old Madison Pike intersection turn restrictions	Access Management	Madison 2040-TP Corridor/Qualitative Assessment	High occurrence of accidents in vicinity of intersection and no turn restrictions on adjacent properties.
Sullivan Street/Wall Triana Highway				
NS-17	Widen Sullivan Street from 3 to 4 lanes from Mill Road to Madison Boulevard	Capacity	Madison 2040-TP Travel Demand Modeling Huntsville MPO 2040 LRTP (Visionary)	2025 projected V/C levels reflect need.
NS-18	Widen Wall Triana Highway from 2 to 4 lanes from Highway 72 to Mill Road	Capacity	Huntsville MPO 2040 LRTP (Visionary)	2025 projected V/C levels reflect need; however, other near term roadway improvements may improve conditions to acceptable levels of service. Needs to be re-evaluated during next Plan update.
NS-19	Center turn lane on Wall Triana Highway from Mill Road to Gooch Lane	Operations	Madison 2040-TP Travel Demand Modeling	2025 projected V/C levels reflect need. Would be interim improvement to NS-18.
NS-20	Northbound right turn lane on Wall Triana Highway at Browns Ferry Road	Operations	Madison 2040-TP Intersection Analysis	Identified as immediate need per Intersection Analysis based on current traffic counts.
NS-21	Northbound right turn lane on Sullivan Street at Mill Road	Operations	Madison 2040-TP Intersection Analysis	Identified as immediate need per Intersection Analysis based on current traffic counts.
NS-22	Roundabout at Sullivan Street/Wall Triana Highway and Mill Road	Operations	Madison 2040-TP Intersection Analysis	Identified as need by 2025 per Intersection Analysis based on projected model volumes.
NS-23	Roundabout at Wall Triana Highway and Browns Ferry Road	Operations	Madison 2040-TP Intersection Analysis	Identified as need by 2025 per Intersection Analysis based on projected model volumes.

Table B-1: Potential Improvement Projects Considered for the 2040-TP

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Comments / Assessment
NS-24	Roundabout at Wall Triana Highway and Gillespie Road	Operations	Madison 2040-TP Intersection Analysis	Identified as need by 2025 per Intersection Analysis based on projected model volumes.
NS-25	Roundabout at Wall Triana Highway and Eastview Road	Operations	Madison 2040-TP Intersection Analysis	Identified as need by 2025 per Intersection Analysis based on projected model volumes.
NS-26	Sullivan Street/Wall Triana Highway enhancements	Capacity/ Operations	Madison Growth Plan	Not evaluated; project redefined into more detailed capacity and operations improvements for evaluation.
NS-27	Sullivan Street bicycle facilities – Front Street to Madison Boulevard	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025	Connectivity to key destinations. Potential to incorporate into recommended capacity improvement for near term.
NS-28	Wall Triana Highway sidewalks – Gillespie Road to Eastview Drive	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	Connectivity to key destinations or other facilities. Enhances safety to schools.
NS-29	Sullivan Street sidewalks – Browns Ferry Road to Mill Road	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025	Connectivity to key destinations or other facilities. Enhances safety to schools. Potential to incorporate into recommended capacity improvement for near term.
NS-30	Sullivan Street/Wall Triana Highway transit services	Transit	Madison 2040-TP Corridor/Qualitative Assessment	Highly traveled corridor with denser residential development. Coordination needed internally and with partner agencies prior to implementation. No timetable identified for transit service.
NS-31	Sullivan Street/Wall Triana Highway "Share the Road" signage and/or pavement markings	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	High bicycle suitability. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.
NS-32	Sullivan Street/Wall Triana Highway Complete Streets applications	Complete Streets	Madison 2040-TP Corridor/Qualitative Assessment	Connectivity to key destinations or other facilities.

Table B-1: Potential Improvement Projects Considered for the 2040-TP

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Comments / Assessment
Balch Road				
NS-33	Extend Balch Road as a 4-lane roadway from Mill Road to Madison Boulevard	Capacity	Huntsville MPO 2040 LRTP (Visionary) Madison 2025 Transportation Master Plan	Input from City staff indicates cost of new roadway is prohibitive in short or mid-term. Railroad crossing requires additional coordination with ALDOT.
NS-34	Widen Balch Road from 2 to 4 lanes from Mill Road to Highway 72	Capacity	Huntsville MPO 2040 LRTP (Visionary)	Not justified per current and projected V/C levels.
NS-35	Roundabout at Balch Road and Gillespie Road	Operations	ALDOT Work Program	Not assessed; currently in ALDOT work program (2018). Need validated through Intersection Analysis.
NS-36	Add 2 feet of lane on each side of Balch Road from Browns Ferry Road to Gooch Lane	Operations	ALDOT Work Program	Not assessed; currently in ALDOT work program (2018).
NS-37	Balch Road sidewalks – Elaine Drive to south of Highway 72	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025 Madison Greenway and Trails Master Plan	Connectivity to key destinations or other facilities. Enhances safety to schools. Project limits changed to reflect current needs per analysis.
NS-38	Balch Road bicycle facilities – Elaine Drive to Highway 72	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025 Madison Greenway and Trails Master Plan	Connectivity to key destinations or other facilities.
NS-39	Balch Road “Share the Road” signage and/or pavement markings	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	High bicycle suitability. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.

Table B-1: Potential Improvement Projects Considered for the 2040-TP

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Comments / Assessment
NS-40	Balch Road Complete Streets applications	Complete Streets	Madison 2040-TP Corridor/Qualitative Assessment	Connectivity to key destinations or other facilities.
County Line Road				
NS-41	Northbound right turn lane on County Line Road at Mill Road	Operations	Madison 2040-TP Intersection Analysis	Identified as need by 2025 per Intersection Analysis based on projected model volumes.
NS-42	Northbound right turn lane on County Line Road at Gillespie Road	Operations	Madison 2040-TP Intersection Analysis	Identified as need by 2025 per Intersection Analysis based on projected model volumes.
NS-43	County Line Road – pedestrian amenities to complement multi-use trail facilities	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	Address through routine maintenance and upgrades. Enhances safety to schools.
NS-44	Access management strategies – Mill Road to Madison Boulevard	Access Management	Madison 2040-TP Corridor/Qualitative Assessment	High amounts of vacant land heighten need to preserve access on high volume corridor.
Burgreen Road				
NS-45	Center turn pockets and median from Hardiman Road to Highway 72	Operations	West Side Master Plan	Promotes urban context and Complete Streets design recommendations from West Side Master Plan.
NS-46	Roundabout at Burgreen Road and Powell Road	Operations	West Side Master Plan	Promotes urban context recommendations from West Side Master Plan.
NS-47	Burgreen Road "Share the Road" signage and/or pavement markings	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment [West Side Master Plan]	Interim strategy to promote West Side Master Plan Complete Streets environment. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.
NS-48	Burgreen Road Complete Streets applications (including multi-use trail)	Complete Streets & Bicycle/ Pedestrian	Madison 2040-TP Corridor/Qualitative Assessment	Promotes urban context and Complete Streets design recommendations from West Side Master Plan.
Improvements along Other Corridors				

Table B-1: Potential Improvement Projects Considered for the 2040-TP

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Comments / Assessment
O-1	Extend Royal Drive from Westchester Road to County Line Road	Capacity	Madison 2025 Transportation Master Plan	Project limit from 2025 Master Plan changed due to Balch Road extension not being considered as part of this plan. Connectivity to improved economic development potential of adjoining property.
O-2	Construct interchange on I-565 near Zierdt Road	Operations	ALDOT Work Program	Not assessed; currently in ALDOT work program (prior to 2025).
O-3	Highland Drive bicycle facilities	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Madison Greenway and Trails Master Plan	Connectivity to key destinations or other facilities.
O-4	Celtic Drive bike lanes	Bicycle/ Pedestrian	Parks and Recreation Master Plan 2025 Madison Greenway and Trails Master Plan	Connectivity to key destinations or other facilities.
O-5	Celtic Drive sidewalks	Bicycle/ Pedestrian	Parks and Recreation Master Plan 2025 Madison Greenway and Trails Master Plan	Connectivity to key destinations or other facilities.
O-6	Maple Street bicycle facility – Madison Station to Skate Park (including off-street segment)	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025	Connectivity to key destinations or other facilities.
O-7	Mill Creek Greenway Northern Extension	Bicycle/ Pedestrian	Parks and Recreation Master Plan 2025 Madison Greenway and Trails Master Plan	Serves recreational purpose more than significant travel movements but improves overall connectivity of multimodal network.
O-8	Bradford Creek Greenway Southern Extension	Bicycle/ Pedestrian	Parks and Recreation Master Plan 2025 Madison Greenway and Trails Master Plan	Serves recreational purpose more than significant travel movements but improves overall connectivity of multimodal network.

Table B-1: Potential Improvement Projects Considered for the 2040-TP

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Comments / Assessment
O-9	Oakland Springs Branch Greenway	Bicycle/ Pedestrian	West Side Master Plan	Serves recreational purpose more than significant travel movements but improves overall connectivity of multimodal network and furthers urban context within West Side Master Plan vision.
West Side Master Plan Improvements (Not Specific to Major Corridors)				
O-10	Powell Road Extension as a 4-lane road from Powell Road to Holladay Drive	Capacity	West Side Master Plan	Promotes more connected roadway to support high levels of growth planned within West Side Master Plan vision.
O-11	New local road that connects Morris Drive to Henderson Lane	Capacity	West Side Master Plan	Promotes more connected roadway to support high levels of growth planned within West Side Master Plan vision.
O-12	New minor collector from Hardiman Road to Segers Road to serve as an additional east-west connection	Capacity	West Side Master Plan	Promotes more connected roadway to support high levels of growth planned within West Side Master Plan vision.
O-13	New road that connects to Highway 72 west of Holladay Boulevard	Capacity	West Side Master Plan	Promotes more connected roadway to support high levels of growth planned within West Side Master Plan vision.
O-14	New road that connects Hardiman Road to Morris Drive	Capacity	West Side Master Plan	Promotes more connected roadway to support high levels of growth planned within West Side Master Plan vision.
O-15	New road that connects from the vicinity of Cedar Acres Drive to Acorn Way	Capacity	West Side Master Plan	Promotes more connected roadway to support high levels of growth planned within West Side Master Plan vision.
O-16	Roundabout at Segers Road and Powell Road	Operations	West Side Master Plan	Promotes urban context recommendations from West Side Master Plan.
O-17	West Side Complete Streets	Complete Streets	West Side Master Plan	Promotes urban context and Complete Streets design recommendations from West Side Master Plan.

Appendix B-2

Implementation Timeframe and Recommended Projects

APPENDIX B-2 – IMPLEMENTATION TIMEFRAME AND RECOMMENDED PROJECTS

Table B-2 identifies the improvements recommended for implementation as part of the 2040-TP, as well as the implementation timeframe as applicable. Recommended improvement projects are prioritized for implementation into one of three timeframes:

- Ongoing –Through routine maintenance between now and 2040 or as funds become available
- Near Term – Now to 2025
- Longer Term – Beyond 2025 through 2040

Potential improvements that are not recommended for implementation in the 2040-TP are also indicated. Although these projects were identified from previous studies or as a part of the 2040-TP analysis activities, these projects were determined to not be needed based on current and projected conditions or are outside the scope of the current study.

Several important points should be taken into account:

- Projects currently funded in the ALDOT and City of Huntsville work programs through 2040 were not assessed, based on the assumption that these projects had already been evaluated and well vetted with community leaders.
- Complete Streets applications were all assigned for longer term implementation given that they typically comprise multiple improvements.
- Access management strategies, trail extensions, and other projects anticipated to be developed through routine maintenance and/or as funds become available are considered as ongoing projects.
- Due to the level of coordination needed between the City and other regional partners for its implementation, potential transit routes were also considered as longer term improvements.

It should be noted that many factors influence the actual implementation timeframe of recommended projects. For example, a recommended project must be included in the City's Capital Improvements Program. Other factors include:

- Project costs and available funding – Projects with higher capital costs may require more time for interagency coordination and/or to acquire funding.
- Relationship to other proposed projects – Multiple proposed projects along the same corridor, as well as projects that serve similar needs on another corridor (such as adding north-south capacity or improving operations at the same intersection), may affect the recommended implementation timeframe.
- Local support – While some projects may reflect greater need based on the assessment factors detailed in the 2040-TP, input from City staff, the Steering Committee, and the public ultimately dictates program priorities.

Improvements are grouped by East-West (EW) or North-South (NS) corridor and then by roadway.

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
Highway 72						
EW-1	Widen Highway 72 from 4 to 6 lanes from County Line Road to Providence Main Boulevard	Capacity	ALDOT Work Program	EW-3, EW-4, EW-5, EW-8	Not assessed; currently in ALDOT work program (2019). Travel demand modeling validates need.	Near Term
EW-2	Widen Highway 72 from 4 to 6 lanes from Holladay Boulevard to County Line Road	Capacity	Madison 2040-TP Travel Demand Modeling	Not applicable	Segment of Highway 72 is outside City limits.	Not Recommended
EW-3	Eastbound left turn lane on Highway 72 at Wall Triana Highway	Operations	Madison 2040-TP Intersection Analysis	EW-1, EW-4, EW-5, NS-17	Identified as immediate need per Intersection Analysis based on current traffic counts. Opportunity to coordinate with ALDOT and City of Huntsville to incorporate into widening project.	Near Term
EW-4	Eastbound right turn lane on Highway 72 at Wall Triana Highway	Operations	Madison 2040-TP Intersection Analysis	EW-1, EW-3, EW-5	Identified as immediate need per Intersection Analysis based on current traffic counts. Opportunity to coordinate with ALDOT and City of Huntsville to incorporate into widening project.	Near Term

[1] All capacity improvements are assumed to include either a continuous center turn lane or a median with left turn lanes.

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
EW-5	Highway 72 sidewalks and pedestrian signals	Bicycle/ Pedestrian	Madison Growth Plan Madison 2040-TP Qualitative Assessment	EW-1, EW-3, EW-4	Connectivity to key destinations or other facilities.	Near Term
EW-6	Highway 72 highway enhancements	Capacity/ Operations	Madison Growth Plan	Not applicable	Not assessed due to change in project definition; replaced by Highway 72 widening and turn lane modifications identified in Intersection Analysis.	Not Recommended
EW-7	Highway 72 transit services	Transit	Madison 2040-TP Corridor/Qualitative Assessment	EW-5	Highly traveled corridor with employment centers. Coordination needed internally and with partner agencies prior to implementation.	Longer Term
EW-8	Access management strategies – County Line Road to Slaughter Road	Access Management	Madison Growth Plan Madison 2040-TP Corridor Assessment	EW-1, EW-3. EW-4	Opportunity to coordinate with ALDOT and City of Huntsville to ensure proper access management applications during widening project.	Ongoing
Gooch Lane						
EW-9	Gooch Lane sidewalks	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	None	Gaps in sidewalk to connect to Hughes Road multi-use trail can be filled through routine maintenance activities. Enhances safety to schools.	Ongoing

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
Huntsville-Browns Ferry Road						
EW-10	Widen Huntsville-Browns Ferry Road from 2 to 4 lanes from Mooresville Road to County Road Line	Capacity	Madison 2040-TP Travel Demand Modeling Huntsville MPO 2040 LRTP (Visionary) West Side Master Plan	EW-11, EW-12, EW-14	2025 projected V/C levels reflect need; however, other near term roadway improvements may improve conditions to acceptable levels of service. o be re-evaluated during next Plan update. Project limits amended to Bowers Road to reflect City boundaries.	Longer Term
EW-11	Huntsville-Browns Ferry Road bike lanes – Burgreen Road to County Line Road	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	EW-10, EW-12, EW-14, EW-16	Connectivity to key destinations or other facilities.	Longer Term
EW-12	Huntsville-Browns Ferry Road sidewalks – Burgreen Road to County Line Road	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	EW-10, EW-11, EW-14	Connectivity to key destinations or other facilities.	Near Term
EW-13	Huntsville-Browns Ferry Road "Share the Road" signage and/or pavement markings	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	EW-11, EW-14	Connectivity to key destinations or other facilities.	Near Term
EW-14	Huntsville-Browns Ferry Road Complete Streets applications	Complete Streets	Madison 2040-TP Corridor/Qualitative Assessment	EW-10, EW-11, EW-14	Connectivity to key destinations or other facilities.	Longer Term
Gillespie Road						

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
EW-15	Eastbound right turn lane on Gillespie Road at County Line Road	Operations	Madison 2040-TP Intersection Analysis	EW-10, EW-17, NS-42	Identified need by 2025 per Intersection Analysis based on projected model volumes.	Near Term
EW-16	Gillespie Road multi-use path from Balch Road to County Line Road	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025 Madison Greenway and Trails Master Plan	EW-17, EW-18, EW-19, NS-43	Connectivity to key destinations or other facilities. Enhances safety to schools.	Longer Term
EW-17	Gillespie Road sidewalks –Balch Road to County Line Road	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	EW-15, EW-16, EW-19, NS-43	Connectivity to key destinations or other facilities. Enhances safety to schools.	Longer Term
EW-18	Gillespie Road "Share the Road" signage and/or pavement markings	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	EW-16, EW-19	Interim strategy to promote Complete Streets environment. Low-cost strategy reinforces bicycle corridors prior to implementation of on-street facilities.	Near Term
EW-19	Gillespie Road Complete Streets applications	Complete Streets	Madison 2040-TP Corridor/Qualitative Assessment	EW-15, EW-16, EW-17, EW-18	Connectivity to key destinations or other facilities.	Longer Term
Eastview Drive						

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
EW-20	Eastview Drive bicycle facilities – Highland Drive to Slaughter Road	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Madison Greenway and Trails Master Plan	Not applicable	Connectivity to key destinations. Right-of-way limitations restrict potential for bicycle facilities.	Not Recommended
EW-21	Eastview Drive sidewalks – Highland Drive to Slaughter Road	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	None	Connectivity to key destinations or other facilities. Enhances safety to schools.	Longer Term
EW-22	Eastview Drive "Share the Road" signage and/or pavement markings	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	EW-21	Low-cost strategy reinforces bicycle corridors prior to/after implementation of on-street facilities.	Near Term
Browns Ferry Road/Old Madison Pike						
EW-23	Widen Old Madison Pike from 3 to 4 lanes from Hughes Road to Slaughter Road	Capacity	Madison 2040-TP Travel Demand Modeling Huntsville MPO 2040 LRTP (Visionary)	EW-24, EW-27, NS 12, NS-13, NS-16	2025 projected V/C levels reflect need; however, other near term roadway improvements may improve conditions to acceptable levels of service. To be re-evaluated during next Plan update.	Longer Term
EW-24	Widen Browns Ferry Road from 3 to 5 lanes from Hughes Road to Sullivan Street/Wall Triana Highway	Capacity	Identified by City Staff	EW-23, NS-12, NS-13, NS-18, NS-19, NS-20, NS-23	Widening from Hughes Road to Plaza Drive already underway. Needed to support retail development.	Near Term

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
EW-25	Old Madison Pike roadway enhancements	Capacity/ Operations	Madison Growth Plan	Not applicable	Not evaluated; project redefined into more detailed capacity and operations improvements for evaluation.	Not recommended
EW-26	Browns Ferry Road sidewalks – Balch Road to Park Meadow	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Madison Greenway and Trails Master Plan	None	Project limits redefined to reflect current needs.	Longer Term
EW-27	Old Madison Pike bicycle facilities	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	EW-23, EW-29, EW-31	Connectivity to key destinations or other facilities.	Near Term
EW-28	Browns Ferry Road "Share the Road" signage and/or pavement markings from Balch Road to Gillespie Road	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	EW-30	High bicycle suitability. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.	Near Term
EW-29	Old Madison Pike "Share the Road" signage and/or pavement markings from Hughes Road to Slaughter Road	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	EW-27, EW-31	High bicycle suitability. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.	Near Term
EW-30	Browns Ferry Road Complete Streets applications	Complete Streets	Madison 2040-TP Corridor/Qualitative Assessment	EW-28	Connectivity to key destinations or other facilities.	Longer Term
EW-31	Old Madison Pike Complete Streets applications	Complete Streets	Madison 2040-TP Qualitative Assessment	EW-23, EW-27, EW-29	Connectivity to key destinations or other facilities.	Longer Term

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
Mill Road/Portal Lane						
EW-32	Widen Mill Road from 2 to 4 lanes from County Line Road to Hughes Road	Capacity	Madison 2040-TP Travel Demand Modeling Huntsville MPO 2040 LRTP (Visionary)	EW-34, EW-35, EW-37, EW-38, EW-40, NS-41, NS-43	2025 projected V/C levels reflect need; however, other near term improvements and project EW- 35 may improve conditions to acceptable levels of service. To be re-evaluated during next Plan update.	Longer Term
EW-33	Extend Portal Lane as a 2-lane road from Shelton Road to Zierdt Road Extension	Capacity	Huntsville MPO 2040 LRTP (Visionary) Madison 2025 Transportation Master Plan	Not applicable	Not assessed; Zierdt Road Extension not justified.	Not Recommended
EW-34	Eastbound right turn lane on Mill Road at Sullivan Street	Operations	Madison 2040-TP Intersection Analysis	EW-32, EW-35, EW-37, EW-38, EW-40, NS-17, NS-18, NS-19, NS-21, NS-22, NS-29	Identified as immediate need per Intersection Analysis based on current traffic counts.	Near Term

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
EW-35	Center turn lane on Mill Road from Hughes Road to County Line Road	Operations	Madison 2040-TP Travel Demand Modeling	EW-32, EW-34, EW-37, EW-38, EW-40, NS-41, NS-43	2025 projected V/C levels reflect need; however, other near term improvements and project WE-32 may improve conditions to acceptable levels of service. To be re-evaluated during next Plan update.	Longer Term
EW-36	Realignment of Mill Road/Hardiman Road intersections at County Line Road	Operations	Madison Growth Plan	Not applicable	Project no longer necessary; new signal at Arbor Trace/Mill Road addresses turn movements and safety.	Not Recommended
EW-37	Mill Road bicycle facilities	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025 Madison Greenway and Trails Master Plan	EW-32, EW-34, EW-35, EW-38, EW-39, EW-40	Connectivity to key destinations or other facilities.	Longer Term
EW-38	Mill Road sidewalks – County Line Road to Bradford Creek Trail	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025	EW-32, EW-35, EW-37, EW-40, NS-41, NS-43	Connectivity to key destinations or other facilities. Enhances safety to schools.	Near Term

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
EW-39	Mill Road "Share the Road" signage and/or pavement markings	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	EW-37, EW-40	Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.	Near Term
EW-40	Mill Road Complete Streets applications	Complete Streets	Madison 2040-TP Corridor/Qualitative Assessment	EW-32, EW-35, EW-37, EW-38, EW-39	Connectivity to key destinations or other facilities.	Longer Term
Palmer Road						
EW-41	Palmer Road/Front Street bicycle facilities	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025	EW-42, EW-43	Connectivity to key destinations or other facilities.	Near Term
EW-42	Palmer Road "Share the Road" signage and/or pavement markings	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	EW-41, EW-43	Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.	Near Term
EW-43	Palmer Road Complete Streets applications	Complete Streets	Madison 2040-TP Corridor/Qualitative Assessment	EW-41, EW-42	Connectivity to key destinations or other facilities.	Longer Term
Hardiman Road						

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
EW-44	Center turn pockets and median on Hardiman Road from Burgreen Road to Segers Road	Operations	West Side Master Plan	EW-45, EW-46, EW-48	Promotes urban context and Complete Streets design recommendations from West Side Master Plan.	Longer Term
EW-45	Roundabout at Hardiman Road and Burgreen Road	Operations	West Side Master Plan	EW-44, EW-46, EW-48	Promotes urban context recommendations from West Side Master Plan.	Longer Term
EW-46	Hardiman Road sidewalks	Bicycle/ Pedestrian	West Side Master Plan	EW-44, EW-45, EW-48	Promotes urban context and Complete Streets design recommendations from West Side Master Plan.	Near Term
EW-47	Hardiman Road "Share the Road" signage and/or pavement markings	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment [West Side Master Plan]	EW-48	Interim strategy to promote West Side Master Plan Complete Streets environment. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.	Near Term
EW-48	Hardiman Road Complete Streets applications (including multi-use trail)	Complete Streets & Bicycle/ Pedestrian	Madison 2040-TP Corridor/Qualitative Assessment	EW-45, EW-46, EW-47	Promotes urban context and Complete Streets design recommendations from West Side Master Plan.	Longer Term
Madison Boulevard						
EW-49	Widen Madison Boulevard from 4 to 6 lanes from County Line Road to east of Madison	Capacity	Madison 2040-TP Travel Demand Modeling	EW-50, EW-53, O-2	2025 projected V/C levels reflect need.	Near Term

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
EW-50	Additional westbound right turn lane on Madison Boulevard at County Line Road	Operations	Madison 2040-TP Intersection Analysis	EW-49	Identified as immediate need per Intersection Analysis based on current traffic counts.	Near Term
EW-51	Additional westbound left turn lane on Madison Boulevard at Zierdt Road	Operations	Madison 2040-TP Intersection Analysis	Not applicable	Not assessed; to be completed as part of Zierdt Road widening to four lanes. Need validated through Intersection Analysis.	Not Recommended
EW-52	Madison Boulevard transit services	Transit	Madison 2040-TP Corridor/Qualitative Assessment	None	Highly traveled corridor with employment and commercial development. Coordination needed internally and with partner agencies prior to implementation. No timetable identified for transit service.	Longer Term
EW-53	Access management strategies – Sullivan Street to Zierdt Road	Access Management	Madison 2040-TP Corridor/Qualitative Assessment	EW-49	Several curb cuts, median breaks and opportunities to consolidate driveways.	Ongoing
Slaughter Road						
NS-1	Widen Slaughter Road from 2 to 4 lanes from Highway 72 to Old Madison Pike	Capacity	ALDOT Work Program	NS-2, NS-3, NS-4	Not assessed; currently in ALDOT work program (2034). Travel demand modeling validates need; projected 2025 V/C ratio indicates needed prior to 2025.	Near Term

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
NS-2	Widen Slaughter Road from 2 to 4 lanes from Old Madison Pike to Madison Boulevard	Capacity	ALDOT Work Program	NS-1, NS-3, NS-4	Not assessed; currently in ALDOT work program (2028). Travel demand modeling validates need.	Longer Term
NS-3	Slaughter Road sidewalks (with widening project)	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	NS-1, NS-2, NS-4	To be addressed through coordination with City of Huntsville during planned widening of Slaughter Road.	Longer Term
NS-4	Slaughter Road Complete Streets applications	Complete Streets	Madison 2040-TP Corridor/Qualitative Assessment	NS-1, NS-2, NS-3	To be addressed through coordination with City of Huntsville during planned widening of Slaughter Road.	Longer Term
Zierdt Road						
NS-5	Widen Zierdt Road from 2 to 4 lanes from Madison Boulevard to south of Madison	Capacity	ALDOT Work Program	NS-7	Not assessed; currently in ALDOT work program (2018). Travel demand modeling validates need.	Near Term
NS-6	Extend Zierdt Road as a 2-lane roadway from 1 mile north of Madison Boulevard to Old Madison Pike	Capacity	Huntsville MPO 2040 LRTP (Visionary)	Not applicable	Not justified per projected V/C levels along parallel roadways (after Slaughter Road widening).	Not Recommended
NS-7	Zierdt Road – pedestrian amenities to complement multi-use trail facilities	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	NS-5	To be addressed through routine maintenance and upgrades and/or coordination with City of Huntsville during future construction.	Ongoing
Shelton Road						

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
NS-8	Widen Shelton Road from 2 to 4 lanes from Madison Boulevard to Old Madison Pike	Capacity	Huntsville MPO 2040 LRTP (Visionary)	Not applicable	Not justified per current and projected V/C levels.	Not Recommended
NS-9	Shelton Road sidewalks	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	None	Serves multi-family residential development. Could be provided through routine maintenance activities.	Ongoing
Hughes Road						
NS-10	Widen Hughes Road from 3 to 4 lanes from Old Madison Pike to Highway 72	Capacity	Madison 2040-TP Travel Demand Modeling Huntsville MPO 2040 LRTP (Visionary)	NS-11, NS-12, NS-13, NS-14, NS-16, EW-23, EW-24	2025 projected V/C levels reflect need.	Near Term
NS-11	Northbound right turn lane on Hughes Road at Eastview Drive	Operations	Madison 2040-TP Intersection Analysis	NS-10, NS-14	Identified as immediate need per Intersection Analysis based on current traffic counts.	Near Term
NS-12	Additional northbound left turn lane on Hughes Road at Browns Ferry Road	Operations	Madison 2040-TP Intersection Analysis	NS-10, NS-13, NS-14, EW-23, EW-24	Identified as need by 2025 per Intersection Analysis based on projected model volumes.	Near Term
NS-13	Additional southbound left turn lane on Hughes Road at Old Madison Pike	Operations	Madison 2040-TP Intersection Analysis	NS-10, NS-12, NS-14, EW-23, EW-24	Identified as need by 2025 per Intersection Analysis based on projected model volumes.	Near Term
NS-14	Hughes Road – pedestrian amenities to complement multi-use trail facilities	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	NS-10, NS-11, NS-12, NS-13, NS-15, EW-9	Address through routine maintenance and upgrades. Enhances safety to schools.	Ongoing

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
NS-15	Hughes Road transit services	Transit	Madison 2040-TP Corridor/Qualitative Assessment	NS-14	Highly traveled corridor with commercial, schools, and activity centers. Coordination needed internally and with partner agencies prior to implementation.	Longer Term
NS-16	Access management strategies – Hughes Road at Old Madison Pike intersection turn restrictions	Access Management	Madison 2040-TP Corridor/Qualitative Assessment	NS-10, NS-11, NS-12, NS-13	High occurrence of accidents in vicinity of intersection and no turn restrictions on adjacent properties.	Ongoing
Sullivan Street/Wall Triana Highway						
NS-17	Widen Sullivan Street from 3 to 4 lanes from Mill Road to Madison Boulevard	Capacity	Madison 2040-TP Travel Demand Modeling Huntsville MPO 2040 LRTP (Visionary)	NS-18, NS-19, NS-21, NS-22, NS-27, NS-32, EW-32, EW-34, EW-35	2025 projected V/C levels reflect need.	Near Term
NS-18	Widen Wall Triana Highway from 2 to 4 lanes from Highway 72 to Mill Road	Capacity	Huntsville MPO 2040 LRTP (Visionary)	NS-17, NS-19, NS-20, NS-21, NS-22, NS-23, NS-24, NS-25, NS-28, NS-29, NS-32, EW-4, EW-5, EW-24, EW-32, EW-34, EW-35	2025 projected V/C levels reflect need; however, other near term roadway improvements may improve conditions to acceptable levels of service. To be re-evaluated during next Plan update.	Longer Term

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
NS-19	Center turn lane on Wall Triana Highway from Mill Road to Gooch Lane	Operations	Madison 2040-TP Travel Demand Modeling	NS-17, NS-18, NS-20, NS-21, NS-22, NS-23, NS-24, NS-25, NS-28, NS-29, NS-32, EW-4, EW-5, EW-24, EW-32, EW-34, EW-35	2025 projected V/C levels reflect need. Would be interim improvement to NS-18.	Near Term
NS-20	Northbound right turn lane on Wall Triana Highway at Browns Ferry Road	Operations	Madison 2040-TP Intersection Analysis	NS-18, NS-19, NS-23, NS-29, EW-24	Identified as immediate need per Intersection Analysis based on current traffic counts.	Near Term
NS-21	Northbound right turn lane on Sullivan Street at Mill Road	Operations	Madison 2040-TP Intersection Analysis	NS-17, NS-18, NS-19, NS-22, NS-29, EW-32, EW-34, EW-35	Identified as immediate need per Intersection Analysis based on current traffic counts.	Near Term
NS-22	Roundabout at Sullivan Street/Wall Triana Highway and Mill Road	Operations	Madison 2040-TP Intersection Analysis	NS-17, NS-18, NS-19, NS-21, NS-29, EW-32, EW-34, EW-35	Identified as need by 2025 per Intersection Analysis based on projected model volumes.	Longer Term
NS-23	Roundabout at Wall Triana Highway and Browns Ferry Road	Operations	Madison 2040-TP Intersection Analysis	NS-18, NS-19, NS-20, NS-29, EW-24	Identified as need by 2025 per Intersection Analysis based on projected model volumes.	Longer Term
NS-24	Roundabout at Wall Triana Highway and Gillespie Road	Operations	Madison 2040-TP Intersection Analysis	NS-18, NS-19, NS-28	Identified as need by 2025 per Intersection Analysis based on projected model volumes.	Longer Term

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
NS-25	Roundabout at Wall Triana Highway and Eastview Road	Operations	Madison 2040-TP Intersection Analysis	NS-18, NS-19, NS-28	Identified as need by 2025 per Intersection Analysis based on projected model volumes.	Longer Term
NS-26	Sullivan Street/Wall Triana Highway enhancements	Capacity/ Operations	Madison Growth Plan	Not applicable	Not evaluated; project redefined into more detailed capacity and operations improvements for evaluation.	Not Recommended
NS-27	Sullivan Street bicycle facilities – Front Street to Madison Boulevard	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025	NS-17, NS-31, NS-33	Connectivity to key destinations. Potential to incorporate into recommended capacity improvement for near term.	Longer Term
NS-28	Wall Triana Highway sidewalks – Gillespie Road to Eastview Drive	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	NS-18, NS-19, NS-24, NS-25, NS-32	Connectivity to key destinations or other facilities. Enhances safety to schools.	Near Term
NS-29	Sullivan Street sidewalks – Browns Ferry Road to Mill Road	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025	NS-18, NS-19, NS-20, NS-21, NS-22, NS-23, NS-32, EW-24, EW-32, EW-34	Connectivity to key destinations or other facilities. Enhances safety to schools. Potential to incorporate into recommended capacity improvement for near term.	Near Term
NS-30	Sullivan Street/Wall Triana Highway transit services	Transit	Madison 2040-TP Corridor/Qualitative Assessment	NS-28, NS-29	Highly traveled corridor with denser residential development. Coordination needed internally and with partner agencies prior to implementation. No timetable identified for transit service.	Longer Term

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
NS-31	Sullivan Street/Wall Triana Highway "Share the Road" signage and/or pavement markings	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	NS-27, NS-32	High bicycle suitability. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.	Near Term
NS-32	Sullivan Street/Wall Triana Highway Complete Streets applications	Complete Streets	Madison 2040-TP Corridor/Qualitative Assessment	NS-27, NS-28, NS-29, NS-30, NS-31	Connectivity to key destinations or other facilities.	Longer Term
Balch Road						
NS-33	Extend Balch Road as a 4-lane roadway from Mill Road to Madison Boulevard	Capacity	Huntsville MPO 2040 LRTP (Visionary) Madison 2025 Transportation Master Plan	Not applicable	Input from City staff indicates cost of new roadway is prohibitive in short or mid-term. Railroad crossing requires additional coordination with ALDOT.	Not Recommended
NS-34	Widen Balch Road from 2 to 4 lanes from Mill Road to Highway 72	Capacity	Huntsville MPO 2040 LRTP (Visionary)	Not applicable	Not justified per current and projected V/C levels.	Not Recommended
NS-35	Roundabout at Balch Road and Gillespie Road	Operations	ALDOT Work Program	NS-36, EW-16, EW-17	Not assessed; currently in ALDOT work program (2018). Need validated through Intersection Analysis.	Near Term
NS-36	Add 2 feet of lane on each side of Balch Road from Browns Ferry Road to Gooch Lane	Operations	ALDOT Work Program	NS-35, NS-37, NS-38, NS-40	Not assessed; currently in ALDOT work program (2018).	Near Term

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
NS-37	Balch Road sidewalks – Elaine Drive to south of Highway 72	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025 Madison Greenway and Trails Master Plan	NS-36, NS-38, NS-40	Connectivity to key destinations or other facilities. Enhances safety to schools. Project limits changed to reflect current needs per analysis.	Near Term
NS-38	Balch Road bicycle facilities – Elaine Drive to Highway 72	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025 Madison Greenway and Trails Master Plan	NS-35, NS-36, NS-37, NS-39, NS-40	Connectivity to key destinations or other facilities.	Longer Term
NS-39	Balch Road "Share the Road" signage and/or pavement markings	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	NS-36, NS-38, NS-40	High bicycle suitability. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.	Near Term
NS-40	Balch Road Complete Streets applications	Complete Streets	Madison 2040-TP Corridor/Qualitative Assessment	NS-36, NS-37, NS-38, NS-39	Connectivity to key destinations or other facilities.	Longer Term
County Line Road						

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
NS-41	Northbound right turn lane on County Line Road at Mill Road	Operations	Madison 2040-TP Intersection Analysis	NS-43, EW-32, EW-35, EW-37, EW-38	Identified as need by 2025 per Intersection Analysis based on projected model volumes.	Near Term
NS-42	Northbound right turn lane on County Line Road at Gillespie Road	Operations	Madison 2040-TP Intersection Analysis	NS-43, EW-15, EW-17	Identified as need by 2025 per Intersection Analysis based on projected model volumes.	Near Term
NS-43	County Line Road – pedestrian amenities to complement multi-use trail facilities	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment	NS-41, NS-42 EW-15, EW-37, EW-38	Address through routine maintenance and upgrades. Enhances safety to schools.	Ongoing
NS-44	Access management strategies – County Line Road from Mill Road to Madison Boulevard	Access Management	Madison 2040-TP Corridor/Qualitative Assessment	None	High amounts of vacant land heighten need to preserve access on high volume corridor.	Ongoing
Burgreen Road						
NS-45	Center turn pockets and median from Hardiman Road to Highway 72	Operations	West Side Master Plan	NS-46, NS-48	Promotes urban context and Complete Streets design recommendations from West Side Master Plan.	Longer Term
NS-46	Roundabout at Burgreen Road and Powell Road	Operations	West Side Master Plan	NS-45, NS-48	Promotes urban context recommendations from West Side Master Plan.	Longer Term
NS-47	Burgreen Road "Share the Road" signage and/or pavement markings	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment [West Side Master Plan]	NS-48	Interim strategy to promote West Side Master Plan Complete Streets environment. Low-cost strategy reinforces bicycle corridors prior to or after implementation of on-street facilities.	Near Term

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
NS-48	Burgreen Road Complete Streets applications (including multi-use trail)	Complete Streets & Bicycle/ Pedestrian	Madison 2040-TP Corridor/Qualitative Assessment	NS-47	Promotes urban context and Complete Streets design recommendations from West Side Master Plan.	Longer Term
Improvements along Other Corridors						
O-1	Extend Royal Drive from Westchester Road to County Line Road	Capacity	2025 Transportation Master Plan	None	Project limit from 2025 Master Plan changed due to Balch Road extension not being considered as part of this plan. Connectivity to improved economic development potential of adjoining property.	Longer Term
O-2	Construct interchange on I-565 near Zierdt Road	Operations	ALDOT Work Program	EW-49	Not assessed; currently in ALDOT work program (prior to 2025).	Near Term
O-3	Highland Drive bicycle facilities	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Madison Greenway and Trails Master Plan	None	Connectivity to key destinations or other facilities.	Near Term
O-4	Celtic Drive bike lanes	Bicycle/ Pedestrian	Parks and Recreation Master Plan 2025 Madison Greenway and Trails Master Plan	Not applicable	Connectivity to key destinations or other facilities.	Longer Term

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
O-5	Celtic Drive sidewalks	Bicycle/ Pedestrian	Parks and Recreation Master Plan 2025 Madison Greenway and Trails Master Plan	Not applicable	Connectivity to key destinations or other facilities.	Longer Term
O-6	Maple Street bicycle facility – Madison Station to Skate Park (including off-street segment)	Bicycle/ Pedestrian	Madison 2040-TP Qualitative Assessment Parks and Recreation Master Plan 2025	None	Connectivity to key destinations or other facilities.	Longer Term
O-7	Mill Creek Greenway Northern Extension	Bicycle/ Pedestrian	Parks and Recreation Master Plan 2025 Madison Greenway and Trails Master Plan	None	Serves recreational purpose more than significant travel movements but improves overall connectivity of multimodal network.	Ongoing
O-8	Bradford Creek Greenway Southern Extension	Bicycle/ Pedestrian	Parks and Recreation Master Plan 2025 Madison Greenway and Trails Master Plan	None	Serves recreational purpose more than significant travel movements but improves overall connectivity of multimodal network.	Ongoing

Table B-2: 2040-TP Improvement and Implementation Recommendations

2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
O-9	Oakland Springs Branch Greenway	Bicycle/ Pedestrian	West Side Master Plan	None	Serves recreational purpose more than significant travel movements but improves overall connectivity of multimodal network and furthers urban context within West Side Master Plan vision.	Ongoing
West Side Master Plan Improvements (Not Specific to Major Corridors)						
O-10	Powell Road Extension as a 4-lane road from Powell Road to Holladay Drive	Capacity	West Side Master Plan	O-16	Promotes more connected roadway to support high levels of growth planned within West Side Master Plan vision.	Longer Term
O-11	New local road that connects Morris Drive to Henderson Lane	Capacity	West Side Master Plan	O-16	Promotes more connected roadway to support high levels of growth planned within West Side Master Plan vision.	Longer Term
O-12	New minor collector from Hardiman Road to Segers Road to serve as an additional east-west connection	Capacity	West Side Master Plan	O-16	Promotes more connected roadway to support high levels of growth planned within West Side Master Plan vision.	Longer Term
O-13	New road that connects to Highway 72 west of Holladay Boulevard	Capacity	West Side Master Plan	O-16	Promotes more connected roadway to support high levels of growth planned within West Side Master Plan vision.	Longer Term
O-14	New road that connects Hardiman Road to Morris Drive	Capacity	West Side Master Plan	O-16	Promotes more connected roadway to support high levels of growth planned within West Side Master Plan vision.	Longer Term

Table B-2: 2040-TP Improvement and Implementation Recommendations

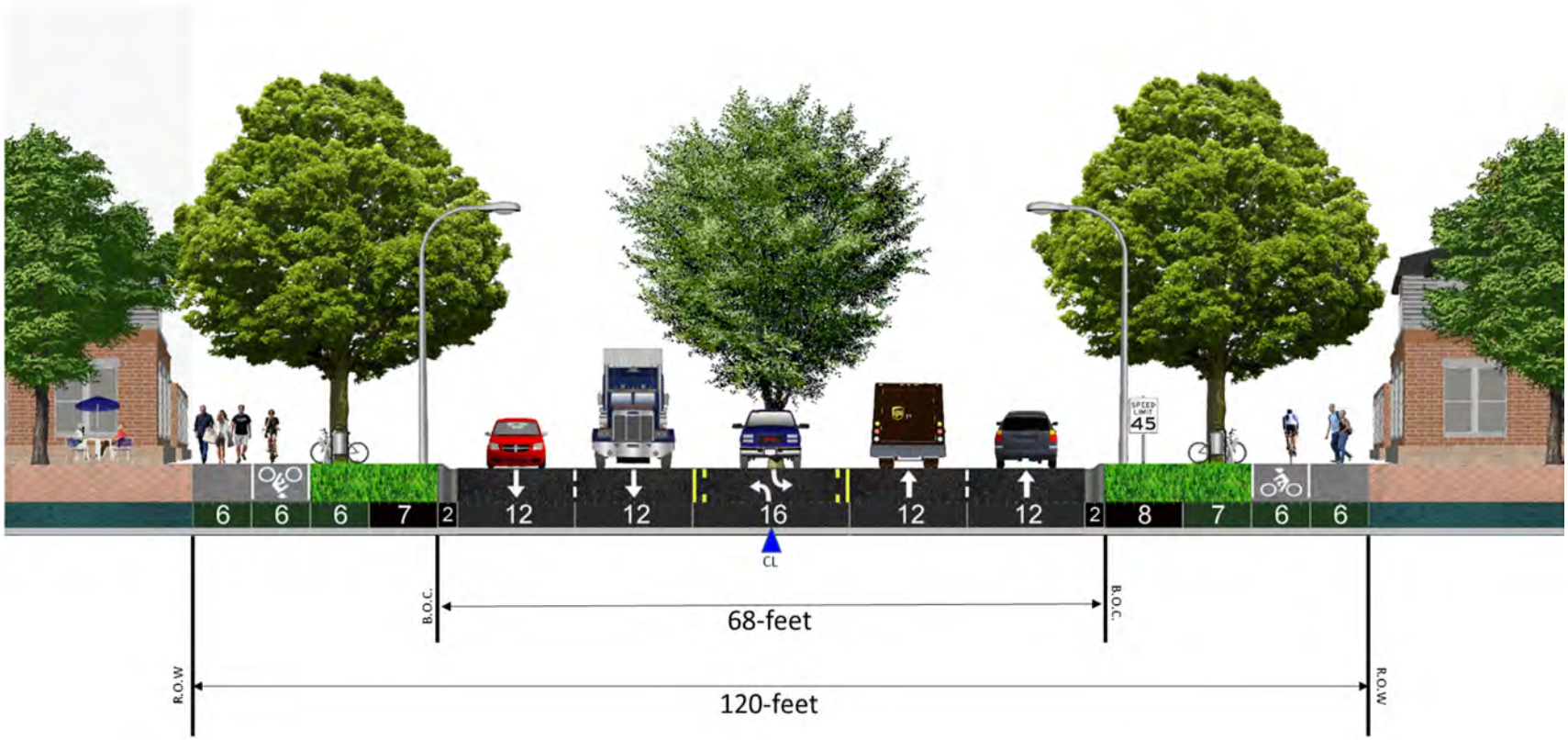
2040-TP Project ID	Project Considered[1]	Project Type	Project Source	Related Projects	Comments / Assessment	Recommended Implementation Timeframe
O-15	New road that connects from the vicinity of Cedar Acres Drive to Acorn Way	Capacity	West Side Master Plan	O-16	Promotes more connected roadway to support high levels of growth planned within West Side Master Plan vision.	Longer Term
O-16	Roundabout at Segers Road and Powell Road	Operations	West Side Master Plan	None	Promotes urban context recommendations from West Side Master Plan.	Longer Term
O-17	West Side Complete Streets	Complete Streets	West Side Master Plan	O-9, O-10, O-11, O-12, O-13, O-14, EW-48, NS-48	Promotes urban context and Complete Streets design recommendations from West Side Master Plan.	Longer Term

Appendix C

City of Madison Guidelines for Complete Streets

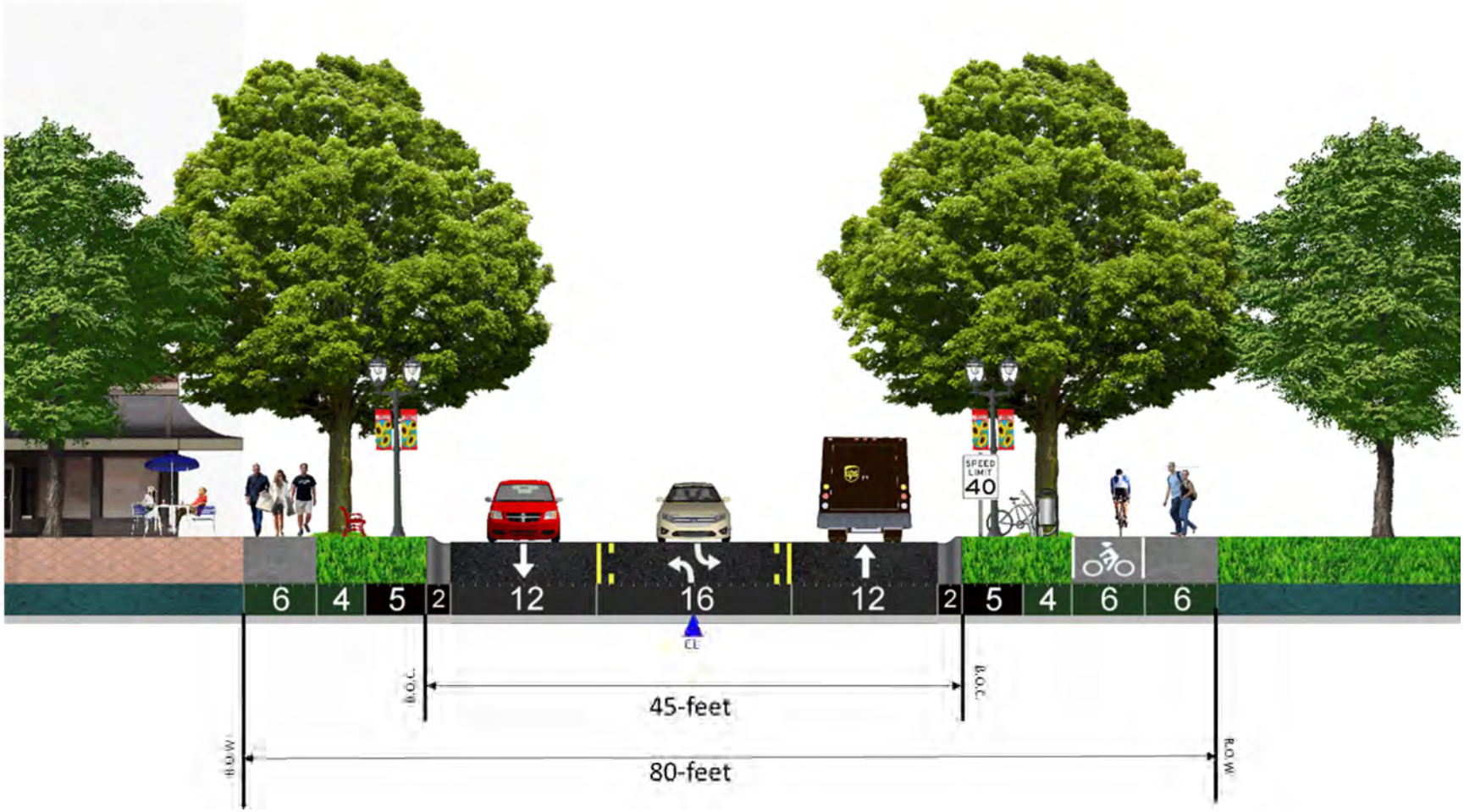
For discussion on Complete Streets see Section 5.2 of this Plan.

Major Arterial –Boulevard – Parkway
120-Foot Right-of-Way



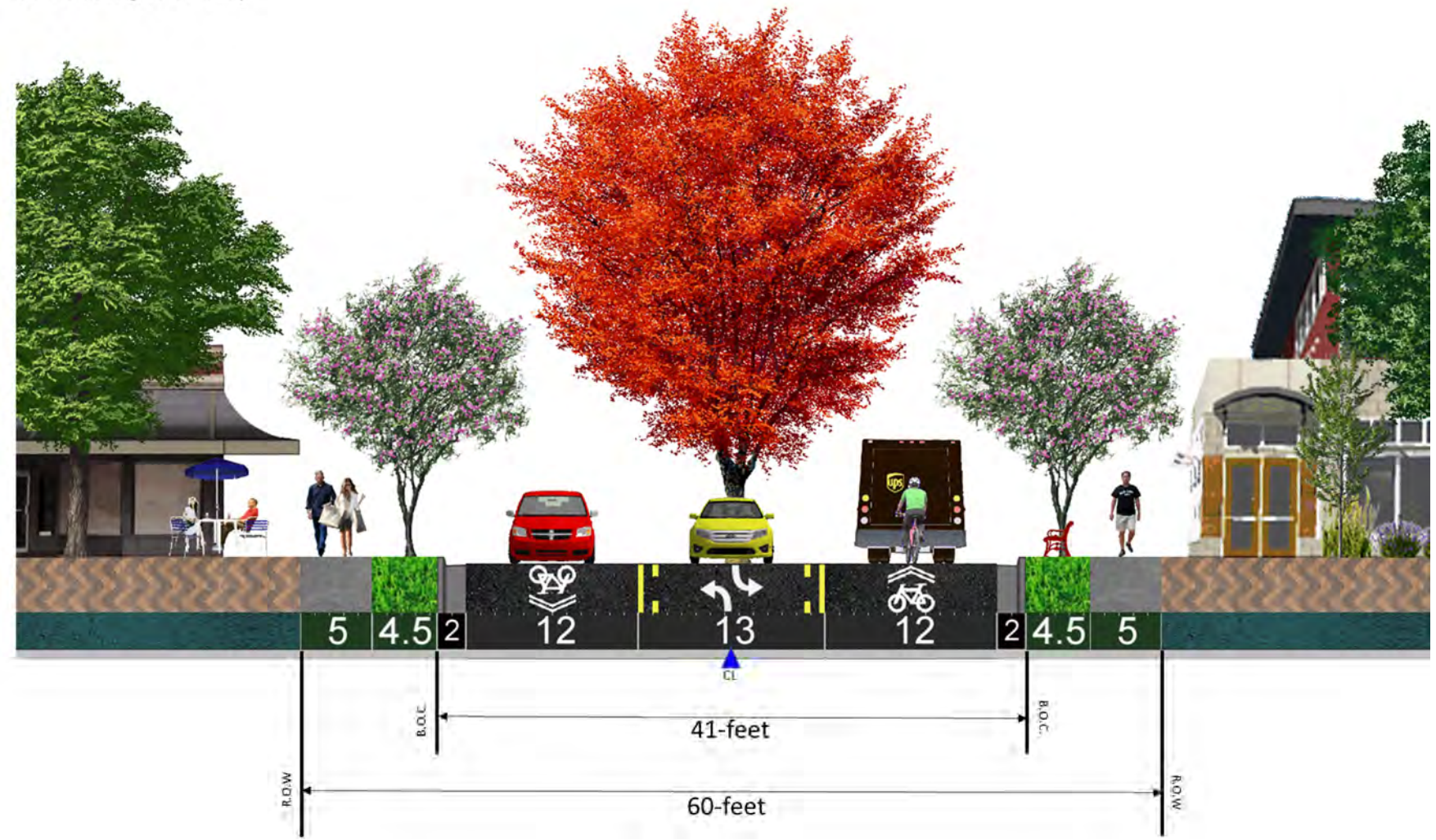
Right-of-Way shown in cross section may vary based on site conditions and will require City Engineer approval for modifications.

Major Collector - Avenue
80-Foot Right-of-Way



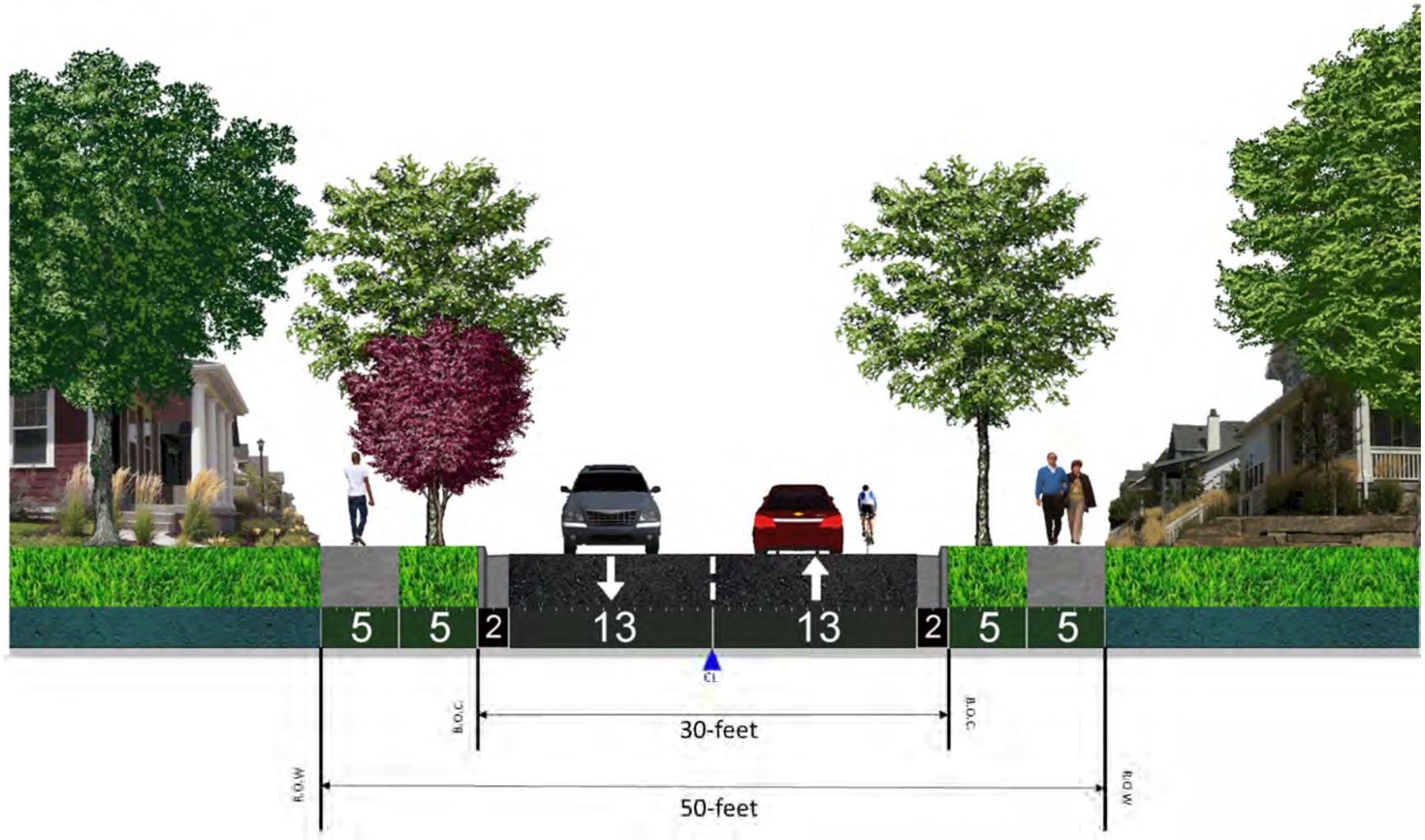
Right-of-Way shown in cross section may vary based on site conditions and will require City Engineer approval for modifications.

Minor Collector
60-Foot Right-of-Way



Right-of-Way shown in cross section may vary based on site conditions and will require City Engineer approval for modifications.

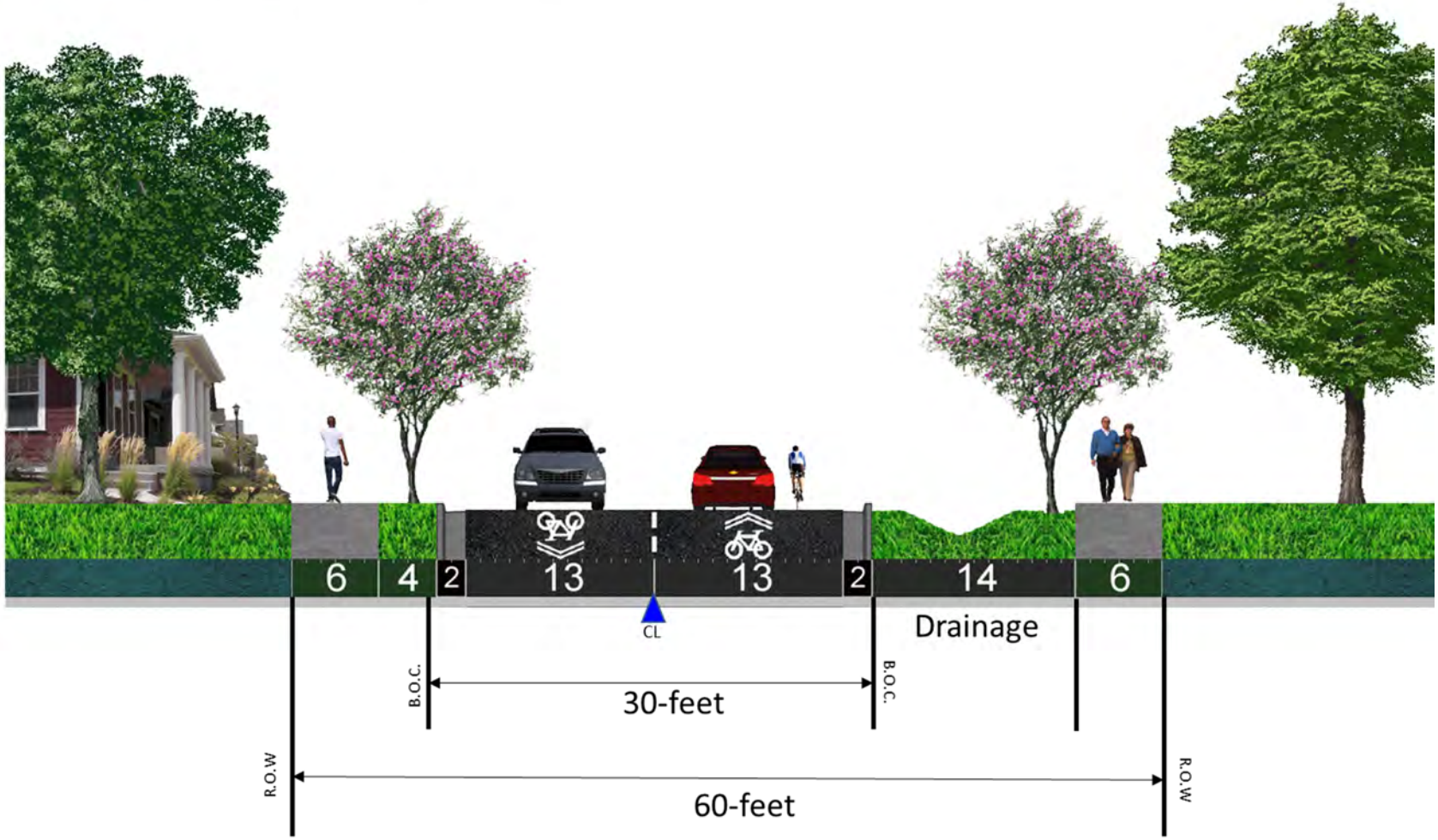
Local Street
50-Foot Right-of-Way



Right-of-Way shown in cross section may vary based on site conditions and will require City Engineer approval for modifications.

Local Street - Alternative

60-Foot Right-of-Way, with drainage



Right-of-Way shown in cross section may vary based on site conditions and will require City Engineer approval for modifications.